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POTATOES IN ONTARIO

A CASE STUDY OF INTER-
INDUSTRY RELATIONSHIPS

ECONOMIC PLANNING BRANCH
POLICY PLANNING DIVISION

**DEPARTMENT OF TREASURY
AND ECONOMICS**



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POTATOES IN ONTARIO

A Case Study of Inter-Industry Relationships

Department of Treasury and Economics
Policy Planning Division
Economic Planning Branch

June, 1968

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PREFACE

The report analyses the production and marketing patterns of the potato industry in Ontario, and studies the inter-relationships of the industries and marketing organizations involved.

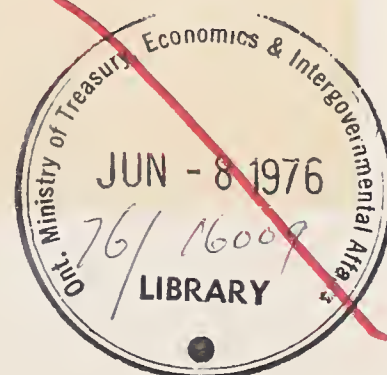
We gratefully acknowledge the advice and assistance provided by various organizations and individuals, in particular, the Canada Department of Agriculture, the Dominion Bureau of Statistics, the Ontario Department of Agriculture, the University of Guelph, the Ontario Fruit and Vegetable Growers Association, and the Ontario Division of the Consumers Association of Canada.

The report was prepared by Mr. L. Bodnar, Economist with the Economic Planning Branch in the Policy Planning Division of the Department of Treasury and Economics. Much of the computational work was undertaken in the Economic and Statistical Services Division of the Department.

E R R A T A

Page 14: Under Imports - last line first paragraph should read
.....almost entirely of processing and table potato
stock from the United States.*

Page 25: Under Leamington-Harrow Area - second line should read
.....extends around Lake Erie.





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MARKETING PROBLEMS OF POTATOES IN CANADA AND IN ONTARIO

On March 22, 1967, Agriculture Minister J. J. Green announced a Federal program aimed at diverting surplus potatoes to non-food uses and thus stabilizing the price that potato growers receive for their product. Potato prices to producers have been seriously depressed because of large surpluses.

The Minister stressed that the potato assistance program was a temporary emergency measure and not a continuing policy of the Federal Government. He stated that the Federal Government would not in the future consider assistance unless direct provincial or producer action is taken to ensure that production is brought in line with demand.

Tables 1a and 1b suggest that during the period 1951 to 1966, fluctuations of various degrees were experienced in volume and farm price of potatoes both in Canada and in Ontario.

Table 1a
PRODUCTION AND FARM PRICE PER CWT.
OF POTATOES, CANADA, 1951 TO 1966

<u>Year</u>	<u>Production</u>		<u>Price/cwt.</u>	
	<u>000's cwt.</u>	<u>Per Cent of Previous Year</u>	<u>\$/cwt.</u>	<u>Per Cent of Previous Year</u>
1951	29,928	-	3.38	-
1952	36,959	123.5	2.81	83.1
1953	41,803	113.1	1.32	47.0
1954	32,163	76.9	2.42	183.3
1955	40,191	125.0	1.77	73.1
1956	42,325	105.3	1.75	98.9
1957	43,744	103.4	1.73	98.9
1958	39,610	90.5	1.72	99.4
1959	35,614	89.9	2.76	160.5
1960	42,696	119.9	1.99	72.1
1961	44,108	103.3	1.40	70.4
1962	46,671	105.8	1.57	112.1
1963	45,809	98.2	1.72	109.6
1964	47,733	104.2	2.90	168.6
1965	46,472	97.4	2.41	83.1
1966	54,679	117.7	1.68	69.7

Graph 1

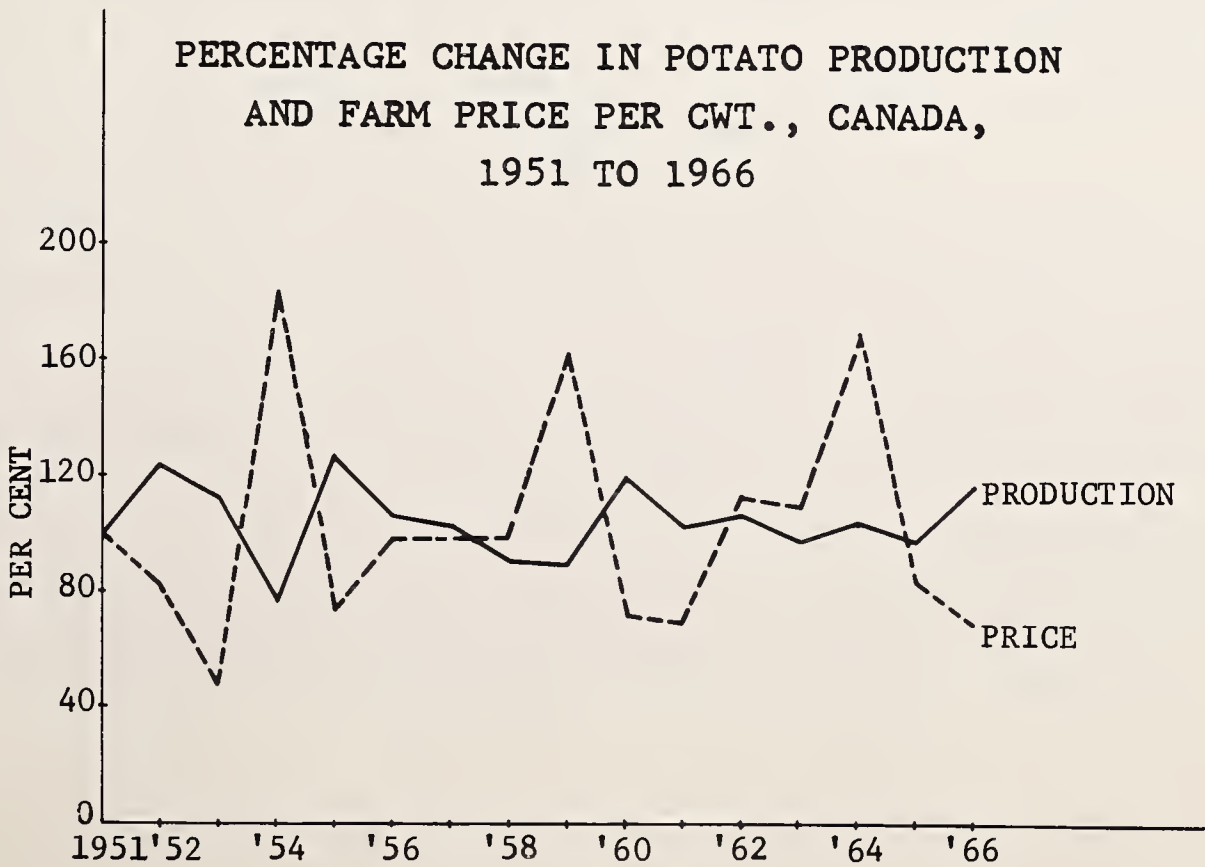


Table 1b

PRODUCTION AND FARM PRICE PER CWT.
OF POTATOES, ONTARIO, 1951 TO 1966

<u>Year</u>	<u>Production</u>		<u>Price/cwt.</u>	
	<u>000's cwt.</u>	<u>Per Cent of Previous Year</u>	<u>\$/cwt.</u>	<u>Per Cent of Previous Year</u>
1951	5,797	-	3.67	-
1952	6,766	116.7	3.58	97.5
1953	7,132	105.4	1.78	49.7
1954	5,695	79.9	2.98	167.4
1955	6,205	109.0	2.20	73.8
1956	7,565	121.9	1.75	79.5
1957	7,128	94.2	1.70	97.1
1958	7,614	106.8	1.97	115.9
1959	7,050	92.6	3.33	169.0
1960	8,935	126.7	2.42	72.7
1961	9,819	109.9	1.57	64.9
1962	9,581	97.6	1.90	121.0
1963	9,792	102.2	2.00	105.0
1964	10,494	107.2	2.70	135.0
1965	10,584	100.9	2.85	105.6
1966	10,003	94.5	1.94	68.1

In this chapter, we will examine in some detail the possible reasons and consequences of quantity and price fluctuations of potatoes in Canada and in Ontario.

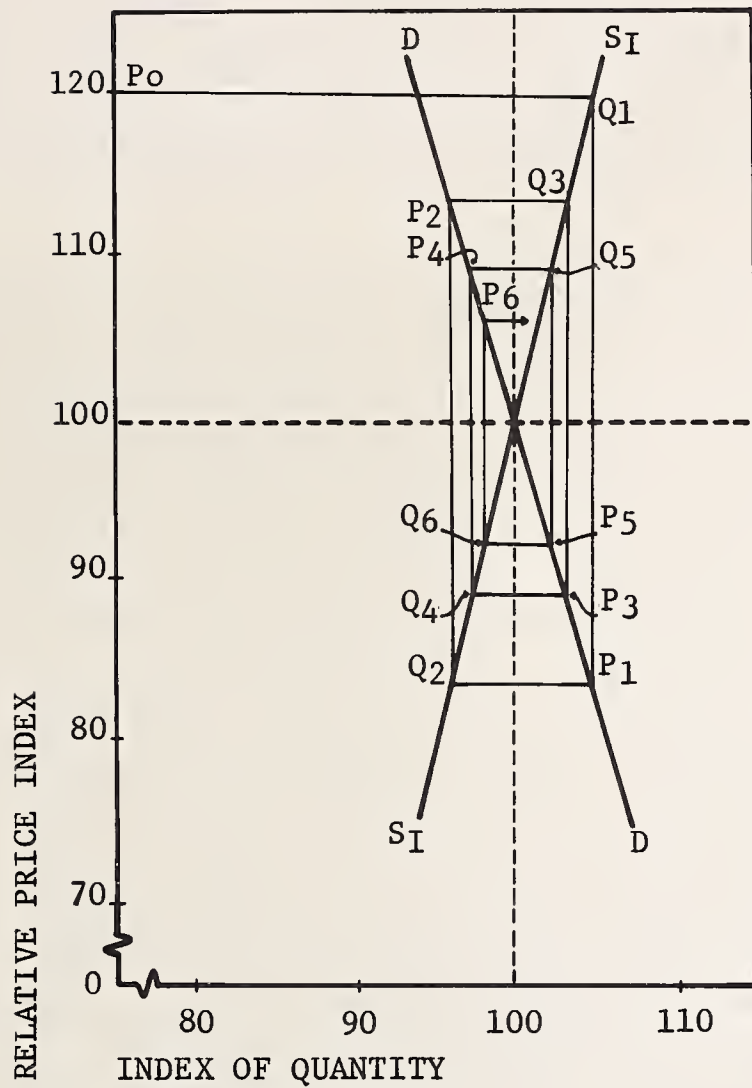
The Cobweb Theorem and its Implications

The cobweb theorem was formulated in the late 1930's to explain commodity price-output sequences in agriculture. This framework of analysis has been frequently employed since that time to clarify such sequences. The cobweb analysis is an equilibrium type of analysis, making use of the traditional concepts of demand and supply, and is concerned with price-output sequences through time where the relevant demand and supply relations do not shift during the time span under consideration. This analysis facilitates the formulation of an explanation of price-output behaviour in agriculture where the growth period, often a season long but sometimes longer, separates the decisions to produce and the decisions to sell a finished product.

Suppose in year 1 the market price of potatoes is P_1 , and is determined by that year's demand and supply relationships. It is assumed that farmers, faced with the decision of planting potatoes which will mature several months later, base their decisions on the prevailing market price, thus Q_1 will be supplied next year. Because of the increased supply next year, the market price of potatoes will fall to P_2 . At that price, Q_2 acres will be planted the following year, but this quantity will cause the price to rise to P_3 .

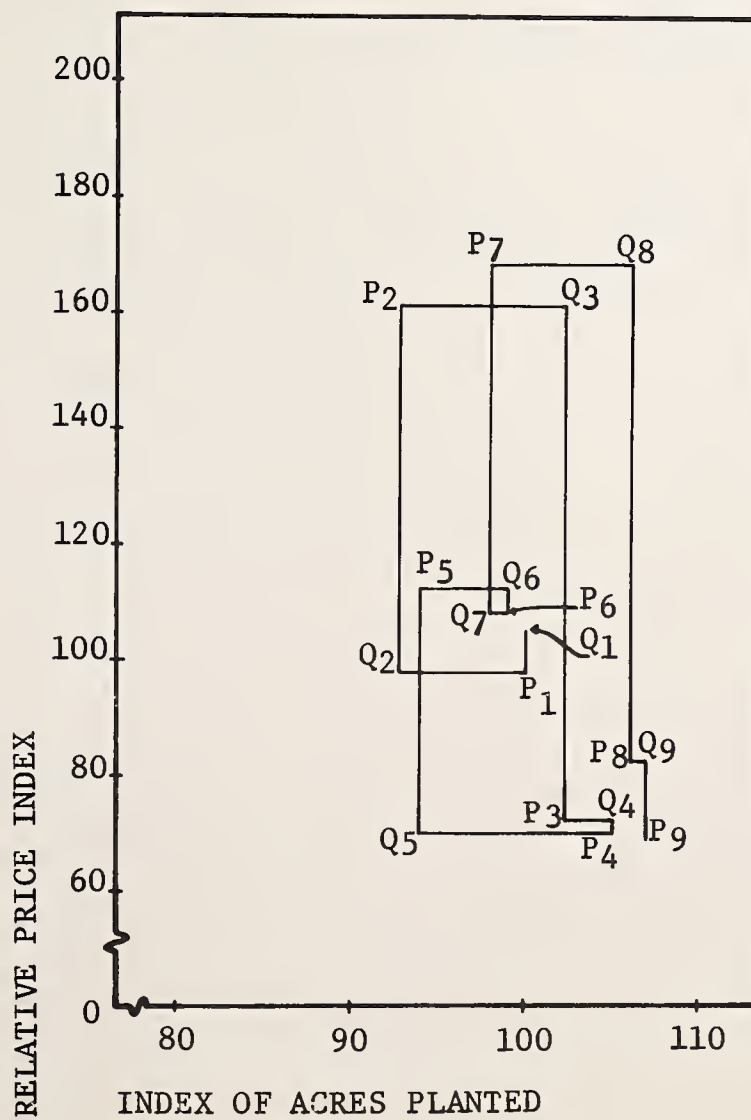
Graph 2a

THEORETICAL COBWEB MODEL FOR POTATOES



Graph 2b

ACTUAL PRICE-ACREAGE OUTPUT PATH FOR POTATOES, CANADA, 1958 TO 1966



With this higher price, the next year's acreage will be increased to Q_3 , where the demand price is P_4 .

Graph 2a shows a theoretical cobweb model. If this model is valid, it would originate a regular, two-year cycle of prices and acreage. To such a cycle producers could adjust by expecting an uneven but regular flow of income. However, the theoretical situation presented by Graph 2a does not apply to real life.

Graph 2b - based on actual acreage and price figures - shows that over a period of time the cobweb breaks down to yield irregular patterns of price variability for a number of years, and it falls into unpredictable two, three, or even four-year cycles. These extreme and unpredictable commodity price fluctuations create uncertainty in the minds of the producers. Past prices became a poor guide to planning the current year's production. The grower becomes uncertain as to whether prices will hold up, rise, or fall in future periods. So it turns out that price uncertainty itself serves to break down the regular cobweb pattern, and thus produce further uncertainty. Furthermore, uncertainty may lead to some unwillingness on the part of the growers to invest in costly new production techniques or to assume long-term financial commitments with new and improved production techniques.

Price and income risks arising out of price uncertainty may be viewed as a social cost, but it is a cost that is borne mostly by the growers. Such costs have two effects: (1) they distort the allocation of resources, and (2) they slow down technological advance.

In connection with the experienced disruption of the cobweb model we will analyze the following problems:

- 1) Price-acreage relationship
- 2) Trends in potato yields and in their fluctuations, and
- 3) Co-ordination of supply and demand.

Potato Price-Acreage Relationship in Canada and in Ontario

Tables 2a and 2b indicate the acreage and price of potatoes in the period 1951 to 1966.

Table 2a

ACREAGE AND FARM PRICE OF POTATOES,
CANADA, 1951 TO 1966

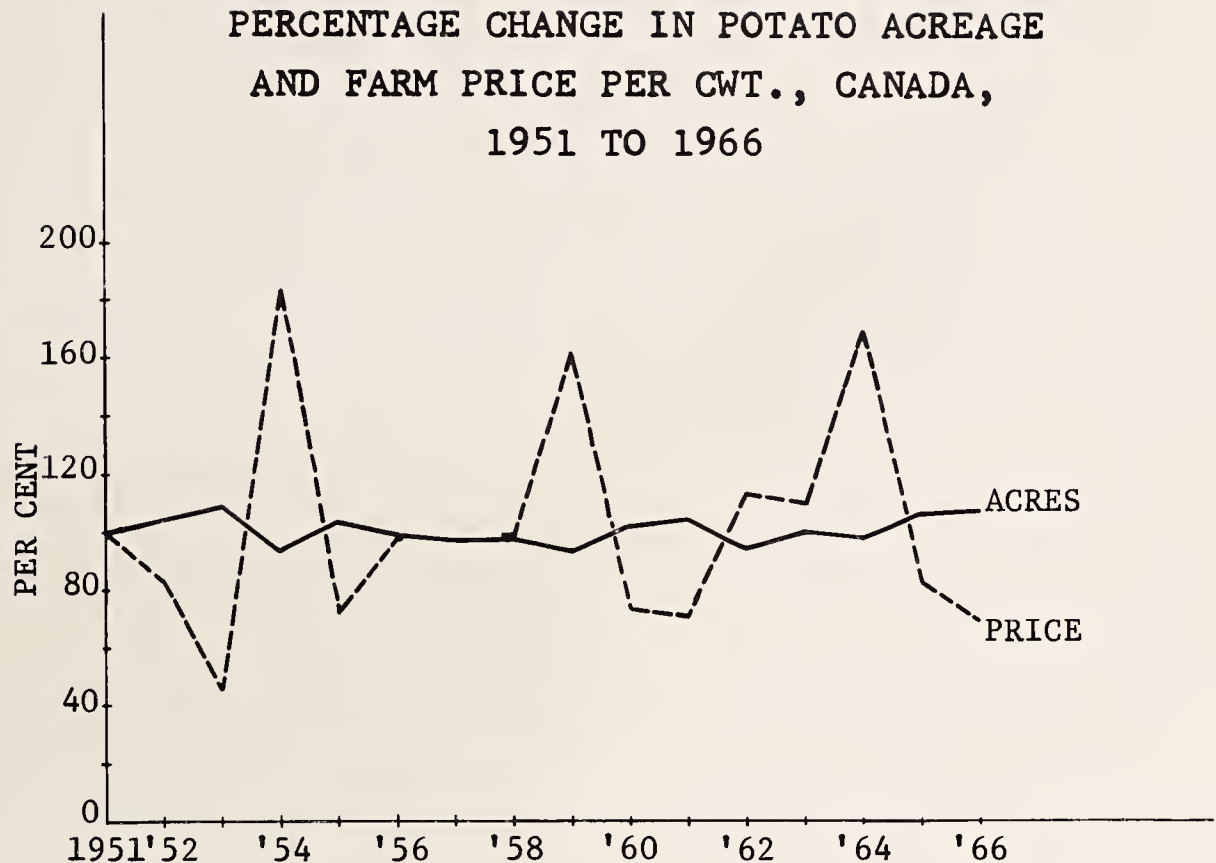
<u>Year</u>	<u>Acreage</u>		<u>Farm Price</u>	
	<u>Acres</u> (000's)	<u>Per Cent of</u> <u>Previous Year</u>	<u>\$/cwt.</u>	<u>Per Cent of</u> <u>Previous Year</u>
1951	284.9	-	3.38	-
1952	295.8	103.8	2.81	83.1
1953	323.6	109.4	1.32	47.0
1954	304.3	94.0	2.42	183.3
1955	313.3	103.0	1.77	73.1
1956	312.5	99.7	1.75	98.9
1957	309.2	98.9	1.73	98.9
1958	304.9	98.6	1.72	99.4
1959	284.1	93.2	2.76	160.5
1960	291.6	102.6	1.99	72.1
1961	305.7	104.8	1.40	70.4
1962	288.1	94.2	1.57	112.1
1963	285.4	99.1	1.72	109.6
1964	281.2	98.5	2.90	168.6
1965	298.8	106.3	2.41	83.1
1966	319.0	106.8	1.68	69.7

Table 2b

ACREAGE AND FARM PRICE OF POTATOES, ONTARIO, 1951 TO 1966

<u>Year</u>	<u>Acreage</u>		<u>Farm Price</u>	
	<u>Acres</u> (000's)	<u>Per Cent of</u> <u>Previous Year</u>	<u>\$/cwt.</u>	<u>Per Cent of</u> <u>Previous Year</u>
1951	54.9	-	3.67	-
1952	56.1	102.2	3.58	97.5
1953	63.0	112.3	1.78	49.7
1954	56.5	89.7	2.98	167.4
1955	55.9	98.9	2.20	73.8
1956	53.7	96.1	1.75	79.5
1957	54.0	100.6	1.70	97.1
1958	54.0	100.0	1.97	115.9
1959	50.0	92.6	3.33	169.0
1960	51.0	102.0	2.42	72.7
1961	51.5	101.0	1.57	64.9
1962	49.9	96.9	1.90	121.0
1963	51.0	102.2	2.00	105.3
1964	53.0	103.9	2.70	135.0
1965	56.0	105.7	2.85	105.6
1966	52.1	93.0	1.81	63.5

Graph 3



Mr. E. S. Eaton, in his article "Potatoes: What Affects Distribution ...", assumed that there was a direct relationship between farm prices and acreage of potatoes: "It has been estimated that a ten per cent increase in price will be followed by a two per cent increase in acreage. Similarly, a ten per cent reduction in price produces a two per cent reduction in acreage." Mr. E. S. Eaton used U.S. calculations in estimating price elasticity of supply ($E = 0.2$), and he assumed "that the results may be generally applicable to Canada."

However, on basis of calculations using actual Canadian data, it was found that the relevant correlation coefficient, which indicates the degree of relationship between previous year's price and current year's acreage is statistically non-significant ($R^2 = 0.1138$).**

Similarly, a non-significant relationship was found between previous year's yields and price and current year acreage ($R^2 = 0.2154$).

On the other hand, a statistically significant relationship was found, for Canada as a whole, between current year's acreage and the two previous years' average price ($R^2 = 0.7437$). For Ontario the above indicated relationship is considerably weaker ($R^2 = 0.2923$), but statistically still significant.

Price elasticity of supply for both Canada and Ontario was estimated at 0.18*** This means that, e.g., a 20 per cent change in two previous years

* Published in Canada Agriculture, Winter Issue, pages 10 - 13.

** Details, see Appendix I.

*** Details, see Appendix I.

average prices will be followed by an approximate 3.6 per cent change in next year's potato acreage.

It has to be pointed out that the practical applicability of the above identified relationships is rather limited. For Canada as a whole 25 per cent of changes in acreage cannot be explained by changes in prices. As for Ontario, price changes provide an even less reliable guide to predicting the probable behaviour of potato growers.

Factors Influencing Potato Yields

Factors which influence the yield of marketable potatoes can be placed into two classes: (1) those which are uncontrollable, and (2) those which can be controlled. In any experimental situation and in actual farm operation, a host of uncontrollable factors will operate: soil type, climate, weather etc. Assuming that the climate and soil type are basically favourable and their effects on yields are known, the assessment of the influence of weather variables is extremely difficult. Therefore any long-term prediction of actual yields seems impossible.

Interaction between weather and technology is undoubtedly an important and rather elusive problem requiring further attention. As a consequence of interaction, there is not one technology but many - depending upon actual weather conditions. In the past two decades, drought resistant varieties, limited tillage combined with more effective weed control, and proper placement of higher rates of improved fertilizer contributed significantly to offset the adverse effect of unfavourable weather. It is reasonable to assume, therefore, that weather hazards can be reduced by adequate technology.

Technology is identified as a factor which is controllable. Under this term we may place seed quality and variety, seed-treatment, fertilizer type, placement and amount, date of planting, plant population, weed-, insect- and disease-control programs, amount and timing of irrigation, method and timing of vine-killing, method and date of harvesting, storage type and management, crop rotation and management of other crops in the rotation.

Appendix I describes briefly how each factor fits into the whole pattern and estimates what effect it can have on marketable yield, assuming that the climate and soil type are basically suitable.

Graph 4

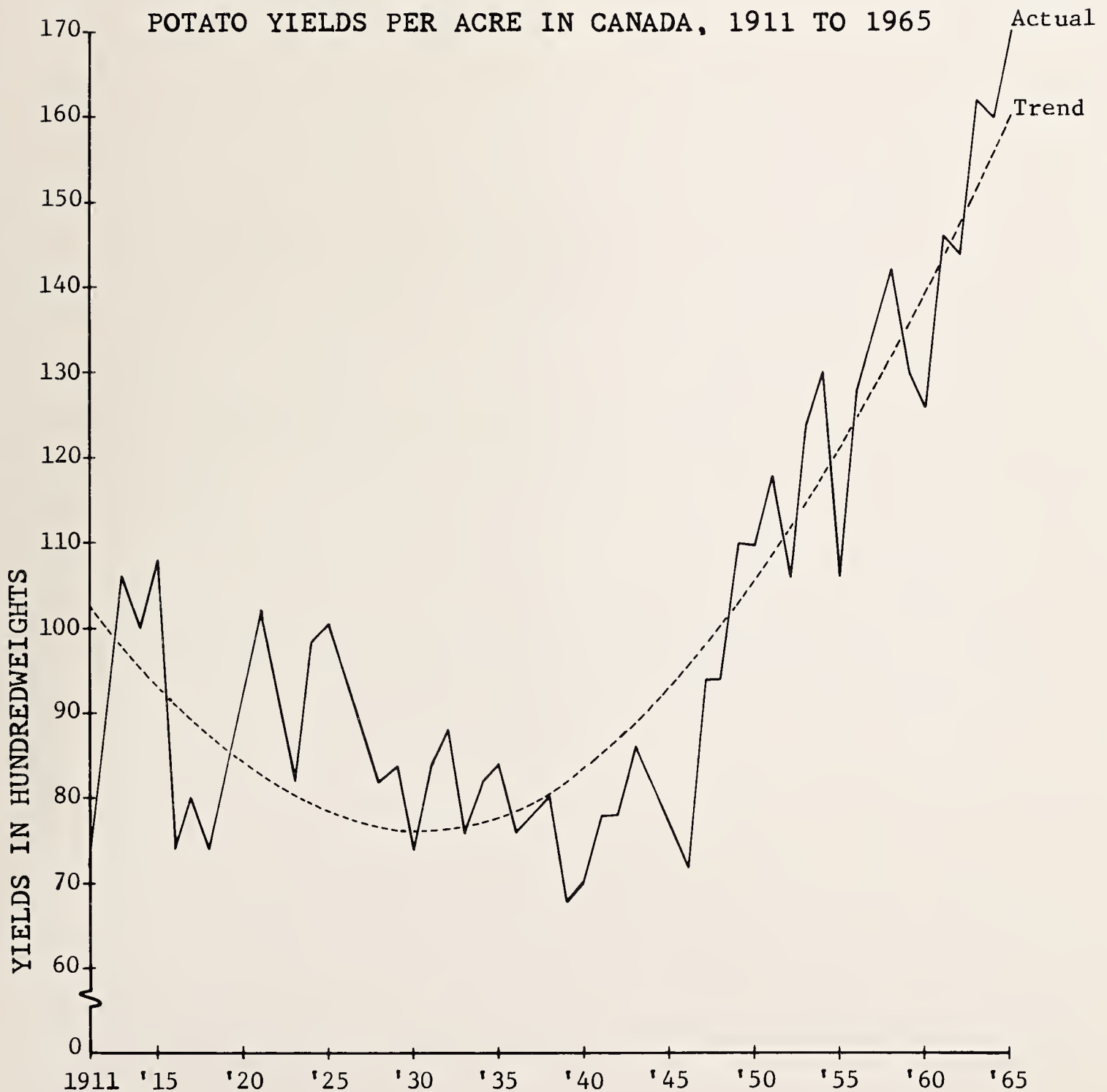
TRENDS IN POTATO YIELDS AND IN THEIR FLUCTUATIONS

In this section we will examine two closely related problems:

- a) What is the tendency of potato yields in Canada and in Ontario,
- b) What is the tendency of yield fluctuations.

Graph shows actual potato yields and their calculated trend in Canada during the period 1911 - 1965. We can notice that after 30 years of virtual stagnation (1911 to 1940) potato yields began to increase, and this increment became spectacular since 1950.*

*Corresponding equation: $\text{Yield} = 138.4004 - (4.07288 \pm 0.5069) \cdot t + (0.06829 \pm .00656) \cdot t^2$



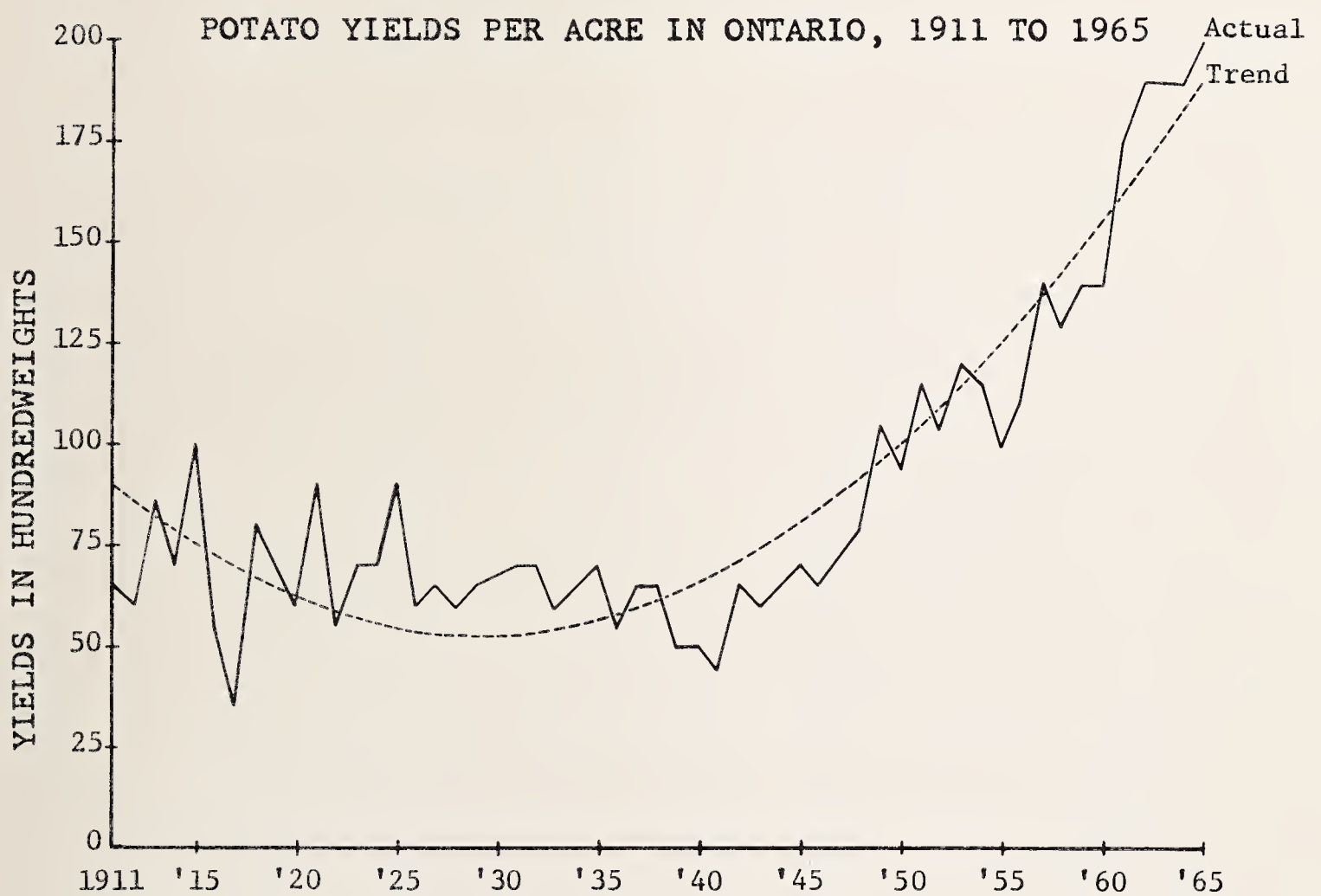
Graph 5

POTATO YIELDS PER ACRE IN ONTARIO, 1911 TO 1965

Actual and Trends

Potato yields in Ontario also experienced a significant expansion during the period 1911 to 1965. Yields began to rise in the late thirties' and continued this tendency at an accelerated rate since 1950.* Graph suggests that potato yields in Ontario surpass the Canadian average.

*Relevant equation: $\text{Yield} = 144.92375 - (6.18870 \pm .68935) \cdot t + (0.10572 \pm .00892) \cdot t^2$



Graph 6

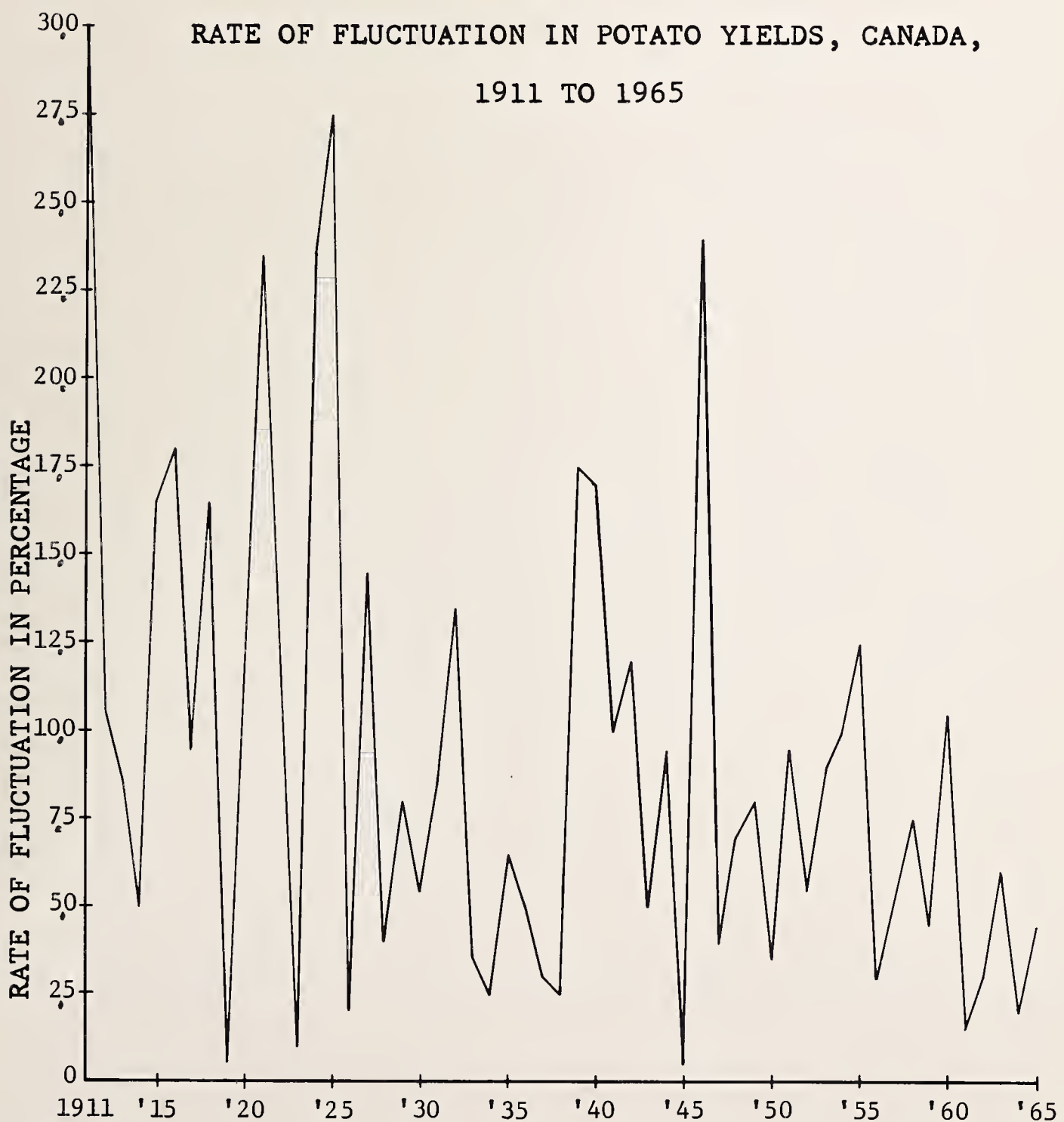
RATE OF FLUCTUATION IN POTATO YIELDS, CANADA, 1911 TO 1965

Graph 6 shows the rate of year-to-year fluctuations in the Canadian potato yields (defined as the deviations from the calculated trend: $\frac{dY_s}{Y_s}$) during

the period 1911 to 1965. The graph suggests that between 1911 and 1946 potato yields fluctuated wildly without showing any identifiable pattern. Since 1947 however fluctuations indicate a slightly decreasing tendency.*

*Corresponding equation: $\frac{dY_s}{Y_s} = .15444 - (.00166 \pm 0.0055) .t$ where t indicates the last two digits of the year, i.e. 11 for 1911.

Note: $\frac{dY_s}{Y_s} = \frac{\text{Actual yield} - 1}{\text{Trend}}$

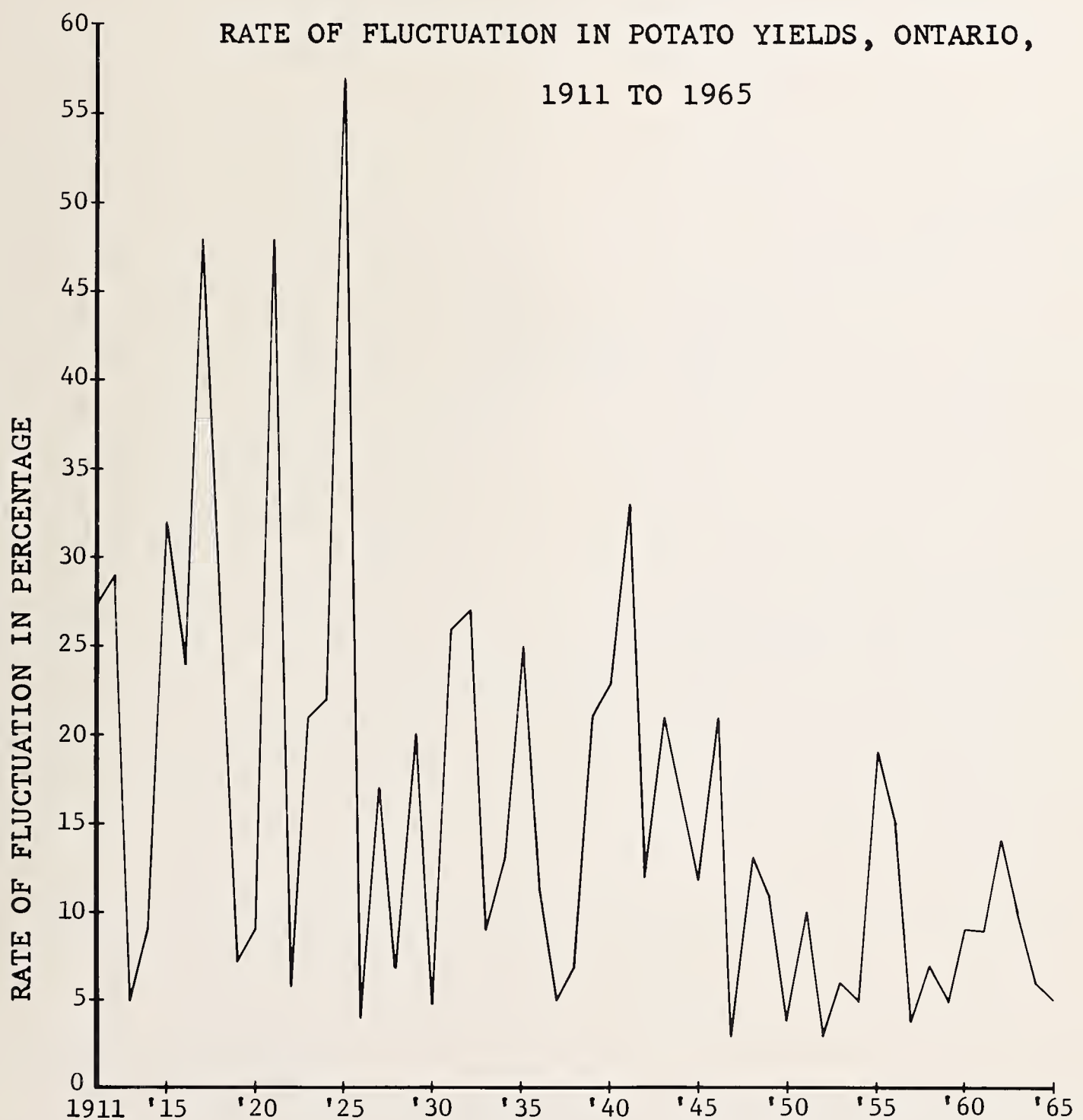


Graph 7

RATE OF FLUCTUATION IN POTATO YIELDS,
ONTARIO, 1911 TO 1965

Graph suggests that in Ontario, after a period of excessive fluctuations (between 1911 and 1925), yields became slightly more predictable (between 1926 and 1945). In the last 20 years year-to-year fluctuations show a definitely decreasing tendency.*

*Corresponding equation: $\frac{dY_s}{Y_s} = .28232 - (.00334 \pm .00092) .t$

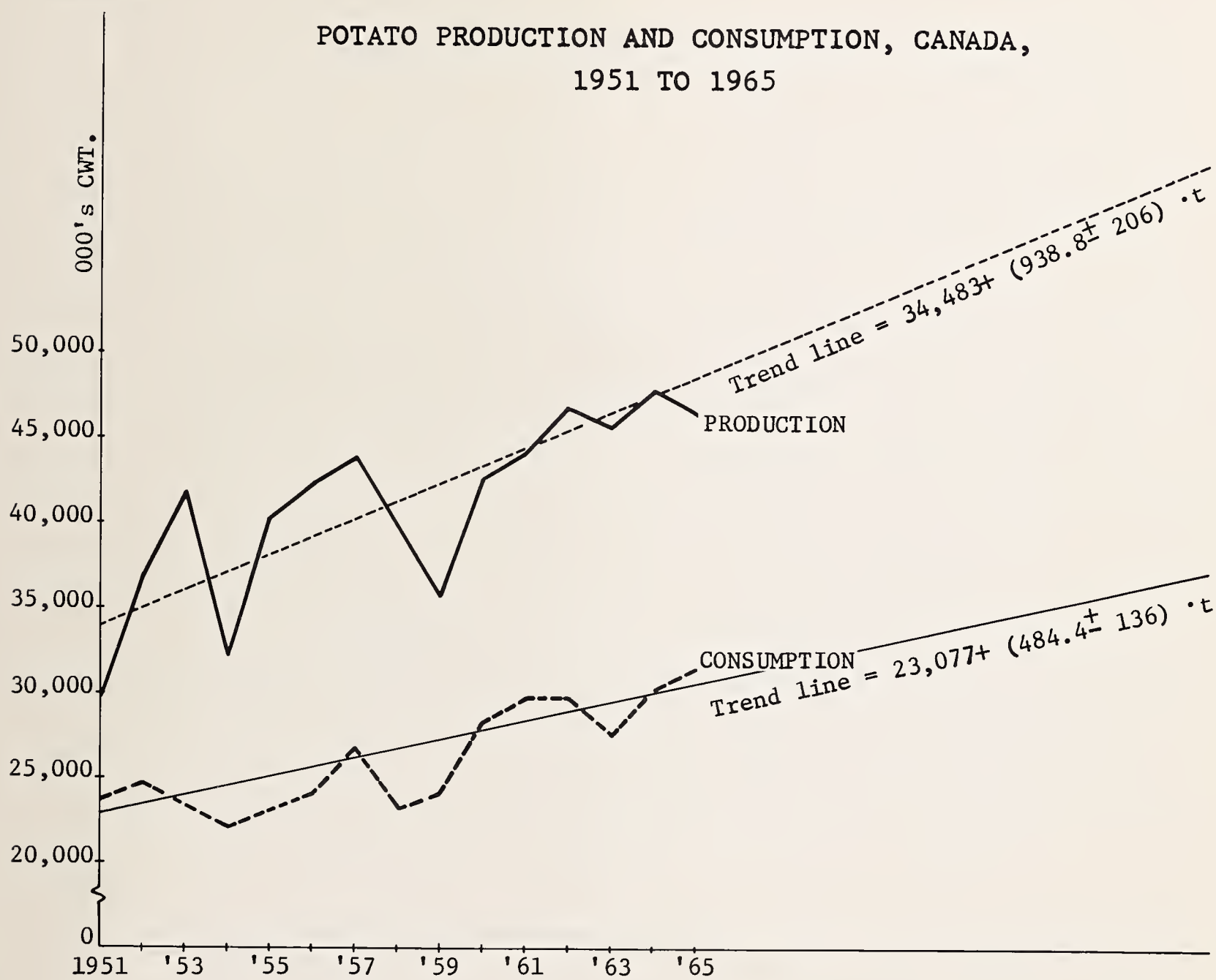


Consumption and Utilization of Potatoes in Canada*

Total supply of potatoes, as distinct from human consumption, is calculated by adding imports to production. From the resulting figures, exports are deducted to give net supply.

Table 4 and graph 8 indicate that during the 1951 to 1965 period, both production and consumption of potatoes increased significantly. During the same period exports and imports accounted for a minor part of total production and consumption. (In 1966 six per cent and five per cent respectively.**)

Graph 8



Consumption of Potatoes

In Canada, per capita consumption of potatoes declined during the last three decades. In 1931 Canadian per capita consumption was estimated at 308 lbs., while by 1961 it had fallen to 164.0 lbs.

* No Provincial data are available.

** See Appendix I.

Table 5

TOTAL AND PER CAPITA CONSUMPTION OF POTATOES
IN CANADA, 1961 TO 1965

<u>Year</u>	<u>Per Capita</u>						<u>Population</u> (000's)	<u>Total</u> <u>Consumption</u> (000's cwt.)
	<u>Total</u> lbs.	%	<u>Table</u> lbs.	%	<u>Processed</u> lbs.	%		
1961	164.0	100.0	144.6	88.2	19.4	11.8	18,238	29,910
1962	160.4	100.0	142.2	88.7	18.2	11.3	18,570	29,786
1963	145.8	100.0	128.2	87.9	17.6	12.1	18,896	27,550
1964	157.1	100.0	133.1	84.7	24.0	15.3	19,237	30,218
1965	161.0	100.0	130.8	81.2	30.2	18.8	19,571	31,509

Table 5 suggests that during the 1961 to 1965 period fresh potato consumption declined steadily. However, because of the remarkable increase in the consumption of processed potato products, total per capita consumption remained fairly stable. In the same period, total use of potatoes rose, because of the increase in the country's population.

According to projections made by the Canada Department of Agriculture, by 1980 annual potato consumption per capita will be 144 lbs. It should be noted, however, that a strict projection is inappropriate under present conditions. Developments in potato processing may introduce new variables in the potato industry which might render these estimates unrealistic.

Potato consumption per capita is often assumed to be related to potato prices and/or personal disposable income. We have examined the validity of these assumptions, and found no statistically significant relationship either between per capita consumption and price or per capita consumption and income.*

Imports

During the 1961 to 1966 period Canada's potato imports accounted for 3.8 to 5.3 per cent of total potato supply (see Table 6), and consisted almost entirely of table potato stock from the United States.*

The bulk of the imports comprises early potatoes, which enter this country before domestic new potatoes are ready for the market. The rate of duty on imported potatoes is 37½ cents per hundred weight.

*See Appendix I.

Table 6

POTATO IMPORTS, CANADA, 1961 TO 1965

<u>Year</u>		<u>Total Imports (1)</u>		<u>Table Potatoes</u>		<u>Seed Potatoes</u>	
		(cwt.)	(\$000's)	(cwt.)	(\$000's)	(cwt.)	(\$000's)
1961	No.	2,325,233	5,050	2,248,851	4,874	76,382	176
	%	(100.0)	(100.0)	(96.7)	(96.5)	(3.3)	(3.5)
1962	No.	1,663,188	4,743	1,528,115	4,507	135,073	236
	%	(100.0)	(100.0)	(91.9)	(95.0)	(8.1)	(5.0)
1963	No.	1,993,823	4,425	1,942,306	4,323	51,517	102
	%	(100.0)	(100.0)	(97.4)	(97.7)	(2.6)	(2.3)
1964	No.	1,410,843	5,907	1,327,835	5,721	83,008	186
	%	(100.0)	(100.0)	(94.1)	(96.9)	(5.9)	(3.1)
1965	No.	1,431,567	7,324	1,413,147	7,219	18,420	105
	%	(100.0)	(100.0)	(98.7)	(98.6)	(1.3)	(1.4)

(1) Excludes fresh sweet potatoes.

Exports

Table-stock exports are limited mainly to regions adjacent to the Canadian border, and account for about one-quarter to one-third of total exports. Seed potato exports, which make up the balance, are important for the economy of the Maritime Provinces, especially for Prince Edward Island.

Table 7

POTATO EXPORTS, TOTAL TO ALL COUNTRIES
AND TO U.S.A., 1961 TO 1966

<u>Year</u>		<u>Canada to All Countries</u>			<u>Canada to U.S.A.</u>		
		<u>Total</u>	<u>Table</u>	<u>Seed</u>	<u>Total</u>	<u>Table</u>	<u>Seed</u>
		-----	(cwt.)-----	-----	-----	(cwt.)-----	-----
1961	No.	2,253,903	664,931	1,588,972	765,124	70,062	695,062
	%	(100.0)	(29.5)	(70.5)	(100.0)	(9.2)	(90.8)
1962	No.	4,552,963	2,274,129	2,278,834	520,496	158,467	362,029
	%	(100.0)	(49.9)	(50.1)	(100.0)	(30.4)	(69.6)
1963	No.	3,571,787	1,589,751	1,982,036	760,594	79,019	681,575
	%	(100.0)	(44.5)	(55.5)	(100.0)	(10.4)	(89.6)
1964	No.	4,561,136	1,871,636	2,689,500	1,894,900	900,873	994,027
	%	(100.0)	(41.0)	(59.0)	(100.0)	(47.5)	(52.5)
1965	No.	4,130,837	1,622,785	2,508,052	2,324,303	864,287	1,460,016
	%	(100.0)	(39.3)	(60.7)	(100.0)	(37.2)	(62.8)
1966	No.	3,264,583	1,171,960	2,092,623	1,177,495	531,308	646,187
	%	(100.0)	(35.9)	(64.1)	(100.0)	(45.1)	(54.9)

Potato Surplus

Potatoes unsold and not used as seed, appear to be the major problem of the Canadian potato growers. During the 1951 to 1965 period the volume of surplus potatoes greatly fluctuated from one year to another and accounted for one-quarter to one-third of total potato supply.

Potato Starch

A relatively small part of the surplus was used in starch manufacturing. According to D.B.S. estimates during the period 1961 to 1964 Canadian starch production and the volume of potatoes used for this purpose was as follows:

Table 8

STARCH PRODUCTION AND POTATOES USED, CANADA, 1961 TO 1964

<u>Year</u>	<u>Starch</u> 000 's cwt.	<u>Potatoes Used</u>	
		000 's cwt.	Per Cent of Surplus
1961	122.4	1,102.0	9.5
1962	172.2	1,548.0	13.7
1963	77.6	698.0	5.0
1964	75.1	675.0	5.8

Total average Canadian consumption of starch and its derivatives amounts to 122,000 tons annually, of which potato starch manufactured in Canada currently supplies about five - ten per cent.* According to the report of the Royal Commission on the New Brunswick potato industry, published a few years ago, the expansion of potato starch manufacturing in Canada is both feasible and possible.

Potatoes as Animal Feed

A considerable but unspecified amount of potatoes is used as livestock feed. According to U.S. data, the feeding value of raw potatoes is 33 to 45 cents per hundredweight. In general, the feeding value of potatoes is higher when the ration is balanced with protein supplement, minerals and green feed.

Potato Surplus and Prices

The effect of surplus on potato prices is well known. Table 9 shows potato surplus and prices during the 1951 to 1965 period. Regression analysis of these data reveals that during this period every million hundredweight of surplus in supply decreased the annual average farm price by nine - fifteen cents per hundredweight. The relevant equation is as follows:

$$\text{Price/cwt.} = 3.68038 - (0.12 \pm 0.03) \times \text{surplus in million hundredweight.}$$

*D.B.S. estimate.

Table 9

POTATO SURPLUS AND POTATO PRICES,
CANADA, 1951 TO 1965

<u>Year</u>	<u>Surplus</u> 000's cwt.	<u>Price</u> \$/cwt.
1951	-	3.38
1952	9,654	2.81
1953	13,829	1.32*
1954	6,248	2.42
1955	14,406	1.77*
1956	13,117	1.75*
1957	13,519	1.73*
1958	11,238	1.72
1959	8,149	2.76
1960	12,648	1.99
1961	11,579	1.40
1962	11,281	1.57
1963	13,931	1.72*
1964	11,583	2.90
1965	9,273	2.41

*Surplus greater than 13,000 cwt.

E.S. Eaton, in his article "Potatoes: What Affects Distribution"* has pointed out: "If we are to be confronted by fluctuating markets, depending in any year on the total crop - there appears to be a number of considerations which may serve to increase average returns to those engaged in the growing and marketing of potatoes. The most fundamental one is the exercise of restraint in expanding production when markets look favourable. Over-expansion, if coupled with good yields, can result in a large total crop, which is actually worth fewer total dollars than a somewhat smaller crop." Our calculations substantiate completely this warning.

*Canada Agriculture, Winter 1967.

CHAPTER II

MAIN CHARACTERISTICS OF POTATO GROWING IN ONTARIO

Potato growing in Ontario occupies a relatively minor position within the agriculture of the Province although Ontario potatoes represent a significant proportion of Canada's total potato production. Ontario is not self-sufficient: large quantities of potatoes are brought in from other provinces, and imports from the United States are also of considerable volume. The bulk of Ontario potatoes is produced in a few well defined areas where soil and weather conditions are suitable to this crop.

Importance of Ontario's Potato Production

In 1966, potatoes accounted for 1.9 per cent of total agricultural cash income in the Province. The comparable figure for Prince Edward Island was 32.8 per cent and for the three Maritime provinces combined, 20.6 per cent. (For details see Appendix I.)

According to Table 10, Ontario's potato area in 1966 amounted to 52,100 acres representing 16.2 per cent of Canada's total acreage under potatoes. In the same year, the potato acreage of P.E.I. was equal to Ontario's, and the three Maritime provinces combined accounted for 38.3 per cent of the total Canadian potato area. Ontario potato production, expressed in hundred-weights, is even more important within Canada. In 1966, the Province produced 18.3 per cent of total Canadian potatoes, while the Maritimes accounted for 47.9 per cent (Appendix II).

It follows from the situation described above that changes in potato production in the Province will affect much more seriously the agriculture of the Maritime provinces (especially P.E.I.) than the farming situation of Ontario.

Movement of Potatoes Into and From Ontario

Table 11 indicates that in the period 1961 - 1966, 18 to 26.1 per cent of the total quantity of potatoes used in the Province was brought in from other provinces - mainly from the Maritimes. According to the Ontario Food Council's estimate, P.E.I. accounted for 65.8 per cent and New Brunswick for 31.9 per cent of total volume of potatoes moved to Ontario's markets from other provinces. Maritime potatoes start entering Ontario in late October and gradually, over the months following, occupy an increasingly significant position.

Table 10

POTATO ACREAGE, CANADA AND PROVINCES, 1961 TO 1966

Year	Canada (1)	P.E.I.	N.S.	N.B.	Maritime Provinces (thousands of acres)		Ont.	Man.	Sask.	Alta.	B.C.	
					Que.							
1961	No. %	305.7 (100.0)	46.2 (15.1)	8.1 (2.7)	54.2 (17.7)	108.5 (35.5)	80.3 (26.3)	51.5 (16.9)	20.3 (6.6)	11.9 (3.9)	20.9 (6.8)	12.3 (4.0)
1962	No. %	288.1 (100.0)	41.0 (14.2)	6.8 (2.4)	50.0 (17.4)	97.8 (34.0)	71.6 (24.9)	49.9 (17.3)	23.0 (8.0)	13.0 (4.5)	22.0 (7.6)	10.8 (3.7)
1963	No. %	285.4 (100.0)	42.0 (14.7)	6.9 (2.4)	53.0 (18.6)	101.9 (35.7)	68.0 (23.8)	51.0 (17.9)	21.0 (7.4)	12.7 (4.4)	21.5 (7.5)	9.3 (3.3)
1964	No. %	281.2 (100.0)	40.0 (14.2)	6.6 (2.4)	54.0 (19.2)	100.6 (35.8)	60.8 (21.6)	53.0 (18.9)	24.5 (8.7)	11.8 (4.2)	21.1 (7.5)	9.4 (3.3)
1965	No. %	298.8 (100.0)	43.0 (14.4)	7.0 (2.3)	57.0 (19.1)	107.0 (35.8)	63.5 (21.3)	56.0 (18.7)	26.5 (8.9)	12.3 (4.1)	23.0 (7.7)	10.5 (3.5)
1966	No. %	319.0 (100.0)	52.2 (16.4)	6.2 (1.9)	64.9 (20.3)	123.3 (38.6)	74.7 (23.4)	52.1 (16.3)	24.5 (7.7)	8.5 (2.7)	25.4 (8.0)	10.5 (3.3)

(1) Excludes Newfoundland (1,817 acres in 1966), Yukon and Northwest Territories (26 acres in 1966).

Ontario's potato imports consist of table-stock and processing potatoes coming from the U.S. During 1961 to 1966, imports accounted for 2.3 to 5.8 per cent of total potatoes used in Ontario. The bulk of the imports are early potatoes that generally enter Ontario before the Province's new potatoes are ready for the market in appreciable volume.

Table 11 also shows that movements from the Province, that is, shipments to other provinces, are insignificant: the majority of Ontario potatoes is used within the Province.

Potato Growing Areas and Potato Varieties in Ontario

The successful production of potatoes requires both special soil and climatic conditions. Potato production in the Province is thus concentrated in areas where these favourable conditions prevail.

Soil Type Suitable for Potato Production

The type of soil in which potatoes are grown may affect dry matter content of tubers because of the water-holding capacity, drainage, aeration, structure, temperature and fertility. Any of these factors could cause differences in the dry weight of potatoes.

The ideal potato soil is usually described as a rich, deep, friable, well-drained, medium loam, free from stones, moderately acid (PH 4.8 to 6.5) soil containing adequate organic matter. Such a soil warms up quickly in the spring and has a high natural fertility and water-holding capacity, plus good aeration for the development of the tubers.

This does not mean that other soils are not suited for potato production. However, the use of soils which are too coarse or too fine in texture will lead to difficulties in some years.

Very coarse soils dry out too much in dry years, delaying germination, reducing yield and stunting top growth. Because of this reduced top growth, weeds grow uncontrolled and soil temperatures rise to the point where after-cooking darkening is encouraged and increased respiration in the tubers causes a loss of dry matter. However, most Ontario potatoes are grown on the coarser-textured soils that, when well managed, produce high yields. These soils are also well suited to mechanized potato production.

Fine-textured soils tend to remain cold and wet in the spring, causing seed pieces to rot in the ground. Compaction later in the season often causes misshapen tubers and difficulties at harvest time.

Table 11

TOTAL SUPPLY OF POTATOES, ONTARIO, 1961 TO 1966

Year	Total Production (000's cwt.)	Total Imports		Movement From Other Provinces to Ontario		Total Exports		Movement From Ontario to Other Provinces		Total Supply
		(000's cwt.)	% of Total Supply	(000's cwt.)	% of Total Supply	(000's cwt.)	% of Total Production	(000's cwt.)	% of Total Production	(000's cwt.)
1961	9,819	664*	5.3	2,243	17.9	146	1.5	69	0.7	12,511
1962	9,581	363*	2.9	2,732	22.1	197	2.1	133	1.4	12,346
1963	9,792	497	3.8	3,029	23.1	145	1.5	48	0.5	13,125
1964	10,494	319	2.3	3,675	26.3	442	4.2	74	0.7	13,972
1965	10,584	n.a.	n.a.	3,424	25.6 ⁽¹⁾	491	4.6	127	1.2	13,390(1)
1966	10,003	795	5.8	3,073	22.6	204	2.0	48	0.5	13,619

*Excludes seed potatoes, figures not available.

n.a. Not available.

(1) Less imports.

Source: Dominion Bureau of Statistics and Canada Department of Agriculture.

Climatic Requirements of Potatoes

Present commercial varieties are derived from species originating in the mountainous regions of Chile in South America. The growing season at these high altitudes has moderate temperatures and long days, conditions which are found in the potato-growing districts of Ontario.

A mean daily temperature of 65° to 70° F. during July is considered best for highest yields, together with a rainfall of one inch per week throughout the growing season. Lack of adequate moisture in July and early August is usually the most serious factor limiting potato production in Ontario.

Potato Varieties in Ontario

Ontario produces a number of potato varieties of which the most important are:

NORLAND - a smooth, uniform, shallow-eyed, red-skinned variety maturing with or a few days earlier than Irish Cobbler. Cooking quality is good when first dug but both flavour and colour deteriorate in storage. The solids content tends to be low.

IRISH COBBLER - still the standard early variety in Ontario. It produces good yields of potatoes with high cooking and chipping quality. Its worst features are uneven shape and deep eyes.

CHEROKEE - matures seven to ten days later than Cobbler. It is scab and blight-resistant but very susceptible to leaf roll. Cooking quality is good but tubers sometimes tend to be rough in shape. Without adequate water and fertility this variety does not give a satisfactory yield. A good chipper.

AVON - sizes its tubers with Cobbler although the tops remain green much later in the season. Tubers are sometimes rough and have medium-deep eyes. It is a very good early chipper. Some harvest cracking has been reported.

CHIPPEWA - a mid-season variety with a good yield of oblong, smooth-skinned tubers. The solids content is usually low.

KESWICK - a mid-season variety with roundish tubers. It yields well but tubers tend to be too large unless close planting is practised.

RED PONTIAC - a medium-late, red-skinned variety with a high yield. The tubers are often deep-eyed and have very white flesh but, when cooked, may not be as mealy as some other varieties.

KENNEBEC - a late-maturing variety with a high yield. When planted at no more than eight inches apart in the row, long, smooth tubers are produced; otherwise large, round tubers result. The tubers green rapidly when exposed to light. It is the standard chipping variety for Ontario.

KATAHDIN - a late-maturing variety with very smooth, shallow-eyed, roundish tubers. It yields well and has fair cooking quality.

NETTED GEM (Russet Burbank) - a late-maturing variety with long, russet, heavily-netted tubers. The high specific gravity and coarse texture give very high quality in baking, chipping and french-frying, but can lead to excessive sloughing in boiled tubers. If irrigation is not available on light soils, there will be a high grade-out of misshapen tubers which may, however, be suitable for processing.

SEBAGO - a very late-maturing variety with roundish to oblong tubers. It yields well. It has excellent colour and flavour and is the most important late table-stock variety in Ontario. It will not produce as good chips as Kennebec.

VARIETIES IN ORDER OF MATURITY

<u>Zone</u> ⁽¹⁾	<u>Early</u>	<u>Medium</u>	<u>Late</u>
A & B	1. Cobbler Avon	Cherokee	Kennebec ⁽²⁾ , Sebago ⁽²⁾
C, Including Thedford Marsh	Norland 1. Cobbler Avon	Cherokee	R. Pontiac, Kennebec, Sebago
D	Norland 1. Cobbler	Cherokee	R. Pontiac, Kennebec, Katahdin, Sebago
E	Norland 1. Cobbler	Cherokee Keswick ⁽⁴⁾ Chippewa ⁽⁴⁾	R. Pontiac, Kennebec, Katahdin, Netted Gem, Sebago
Bradford Marsh	1. Cobbler		Kennebec, Sebago
F	Norland 1. Cobbler	Cherokee Keswick Chippewa	R. Pontiac ⁽³⁾ , Kennebec ⁽³⁾ Katahdin ⁽³⁾ , Netted Gem
G	Norland 1. Cobbler		Cherokee, Keswick, Chippewa, Netted Gem

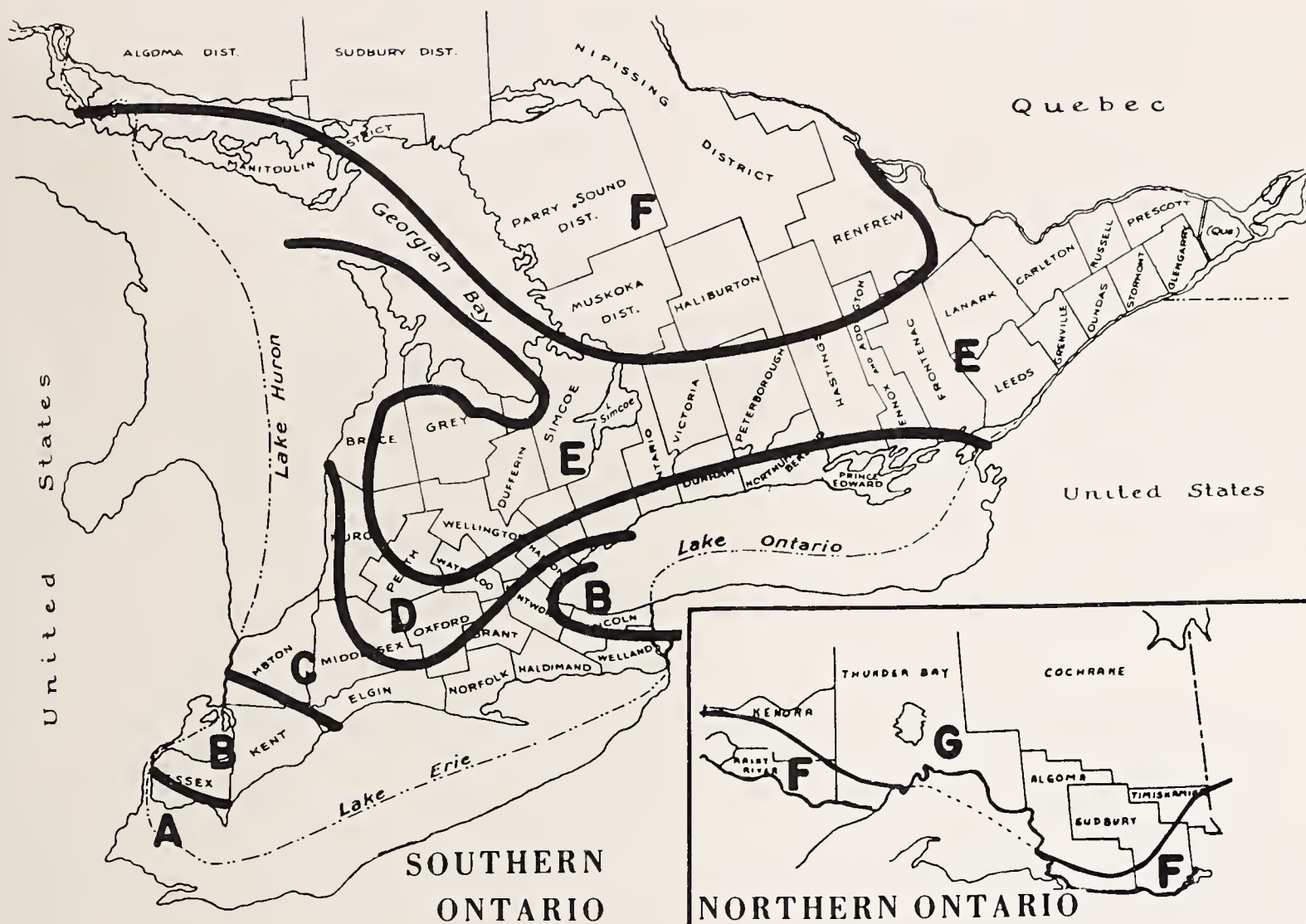
(1) See map on page 24.

(2) For local chip trade only.

(3) Sudbury-Walford, Renfrew and Lakehead areas only.

(4) Not satisfactory in southern part of Zone E.

ZONATION MAP OF SOUTHERN ONTARIO



Note: Zone A has the longest growing season and is the small region in the Leamington-Harrow-Amherstburg area bordering on Lake Erie. The other zones are progressively shorter in growing season. The zone lines are approximate and do not represent sharp changes in climate. The gradation of temperature and growing season from one zone to another is gradual.

CLIMATE OF ONTARIO

Most vegetable production is concentrated in southern Ontario. There are differences in climate even in this small area, particularly in the length of the growing season and in average temperatures.

TABLE

Average Frost-free Period in Climatic Zones of Ontario

Zone	Average frost-free period (days)	Average date of last spring frost	Average date of first fall frost
A	165 or more	May 1	Oct. 13
B	155 - 165	May 8	Oct. 10
C	150 - 155	May 11	Oct. 7
D	140 - 150	May 25	Oct. 2
E	120 - 140	May 22	Sept. 25
F	110 - 120	June 1	Sept. 17
G	100 or less	June 15	Sept. 1

Source: Ontario Department of Agriculture and Food, 1968 Ontario Vegetable Production Recommendations.

Table gives approximate growing periods and dates of first and last killing frost in each zone. The average frost dates given in the Table are those at which in half the years the frost-free period begins and ends. For example, in Zone C the last killing frost occurred later than May 11 in about 5 out of 10 years, and the first killing fall frost occurred before October 7 in 5 out of 10 years. These dates must, of course, be used as approximate guides rather than as absolute predictions.

It is obvious that there are many local variations due to topography, altitude, natural air drainage and nearness to water that influence growing conditions. Cold air tends to flow, like water, into low-lying areas. Plants may be frost-damaged at the bottom of a slope and not have been injured on the slope or at the top of a hill. Particularly during spring a south-facing slope or an area surrounded by a windbreak will be warmer than an unprotected area. These local variations must be considered in deciding the location of a planting or the time of planting.

A Short Review of the Major Potato-growing Areas in Ontario

1. Leamington-Harrow Area (Essex County) - with some 4,500 acres of potatoes extends around Lake Ontario. Potatoes produced on market gardens and farms specializing in horticulture. Average potato acreage is some 35 acres per farm. An approximate 80 per cent is used as table-stock and goes to the early market mainly. The remainder is sold to processors.
2. Port Stanley-Union Area (Elgin County) - has an estimated 1,300 - 1,400 acres of potatoes each year. Local growers have a rotation system based on tobacco, potatoes and rye. Only a few farms grow potatoes on an area larger than 100 acres, and average potato acreage is 50 - 60 acres per farm. An estimated one-third of potatoes is used for processing and the rest is sold on the fresh market.
3. Thedford-Grand Bend Area (Lambton County) - with 1,300 - 1,400 acres of potatoes, grows good quality marsh potatoes, mainly on vegetable farms. Potato acreage on farms ranges from 30 - 80 acres mainly. An estimated 80 per cent of produce is sold as table potatoes. Potato acreage has tripled in this area within the past ten years.
4. St. Jacobs-Hespeler Area (Waterloo County) - potatoes grown mostly on mixed farms. Total area of potatoes is estimated at 1,000 acres. Acreage of potatoes on farms varies from five to two hundred acres. Potatoes are used for table-stock, processing and seed in that order.
5. Ancaster (Wentworth County) - another important potato area in the Province. There are a few large-scale growers specializing in table or processing potatoes. However, the bulk of potatoes is grown on mixed farms of varying size. Table-stock takes most of the production. However, potato chippers are purchasing an increasing proportion of the crop each year. Total potato area is estimated at 2,500 - 2,600 acres.
6. Alliston-Beeton-Angus Area (Simcoe County) - is the heart of Ontario's potato production. There are two main reasons for this: fine, sandy soil covering an approximate 100 square miles, and the large-scale purchases of the local processing plant owned by Salada Foods. Total potato acreage amounts to 10,000 acres, and accounts for 18 - 20 per cent of total potato production in the Province. There are 60 growers in the area. Average potato acreage is 160 acres per farm, and there are growers with 500 - 800 acres of potatoes each. An estimated 60 per cent of the crop is used for processing, and the balance is sold on the fresh market.

7. Shelburne-Honeywood-Orangeville Area (Dufferin County) - with its 3,000 - 3,200 acres of potatoes is also a significant potato-growing region in the Province. Potato acreage is smaller than in Alliston, and growers are engaged in mixed farming, rather than specialized in potatoes. Only 20 per cent of the crop is sold to processors.
8. Bradford Marsh Area (Simcoe County) - grows some 700 acres of potatoes. Farms are specializing in vegetable growing with a few areas of potatoes each.* Potato acreage is continually declining. Growers prefer more profitable crops, and consumers dislike potatoes grown in this area.
9. Mount Albert-Uxbridge Area (Ontario County) - has approximately 2,500 acres of potatoes grown mostly on livestock-oriented mixed farms. Farm size varies from 100 to 150 acres, with some 30 - 60 acres of potatoes. Half of the crop is sold to processors, and the rest sold to the fresh market.
10. Ottawa Valley (Carleton, Renfrew, Prescott Counties) - considered an area of great potential for potatoes. At present an estimated 2,300 - 2,400 acres of potatoes are grown mainly on mixed farms, and on a rather small scale (10 - 20 acres per farm). There are a few growers specializing in potatoes. Potato acreage on these specialized farms ranges from 100 - 200 acres.
11. Bleazard Valley (Sudbury District) - approximately 1,000 acres of potatoes. The climate is the main problem for potato growers in this area, as they encounter very late frosts in the spring, and quite often severe rain storms at harvest time with early frost and very cool weather. There are some 40 potato growers, the average potato acreage being between 15 and 20. Some have as little as five acres of potatoes, while a few have up to 50 acres.

*"Federal Farms", with 100 acres of potatoes, represents an exception.

Table 12

SUMMARY OF WEATHER AND SOIL CONDITIONS OF THE
MAJOR POTATO GROWING AREAS IN ONTARIO

	<u>Leamington</u>		<u>Grand Bend</u>		<u>Port Stanley</u>	<u>St. Jacobs</u>	<u>Ancaster</u>	<u>Alliston</u>	<u>Shelburne</u>	<u>Bradford</u>	<u>Mount Albert</u>	<u>Ottawa Valley</u>	<u>Sudbury</u>
<u>Weather Conditions</u>													
Heat Units	3,500	3,100	3,000	2,600	2,900	2,600	2,300	2,600	2,000	2,700	2,600	2,000	
Frost-free Days	170	155	150	135	150	130	120	130	110	140	135	110	
July Maximum	81°	80°	81°	79°	81°	80°	76°	80°	77°	80°	80°	77°	
May-Sept. Precipitation	14"	15"	14"	15"	14"	14"	16"	14"	15"	14"	15"	15"	
Water Deficiency	4.5"	2"	3"	1"	3.5"	2"	1"	2"	2"	2"	2"	1.5"	
Fall Frost	Oct. 20	Oct. 10	Oct. 7	Oct. 2	Oct. 5	Sept. 27	Sept. 20	Sept. 27	Sept. 24	Sept. 30	Sept. 28	Sept. 24	

Soil Conditions

Texture	Gravelly Loam and Sandy Loam With Gravely Subsoil or Clay	Muck	Sandy Loams	Fine Sandy Loam	Sandy Loam	Gravelly Sandy and Fine Sandy Loam	Mostly Silt Loam, Some Fine Sandy Loam	Muck	Sandy Loam	Sandy Loam to Fine Sandy Loam	Sandy Loam to Fine Sandy Loam		
PH (Acidity)	Acid	Mildly Acid	Mildly Acid	Mildly Acid	Mildly Acid	Mildly Acid	Nearly Neutral	Mildly Acid	Mildly Acid	Acid	Acid		
Moisture Holding	Dry on Gravely Subsoil	Good	Tends to be Dry	Tends to be Dry	Tends to be Dry	Fairly Good	Good	Good	Tends to be Dry	Fairly Good	Fairly Good		

Source: Ontario Research Foundation.

CHAPTER III

POTATOES FOR PROCESSING

The demand for processed foods is steadily increasing. High and rising levels of consumer income and the increasing number of women employed in the expanding economy seem to favour continuing expansion of the demand for processed foods in general and processed potato products in particular. Recently, sales of processed potatoes for institutions, restaurants, hotels, etc., have greatly increased. This tendency is seen from the statistical data on the volume of potatoes used both in Canada and in Ontario.

Table 13

POTATOES USED FOR PROCESSING IN CANADA
AND ONTARIO, 1960 TO 1966

<u>Year</u>	Potatoes Used for Processing in Canada	Ontario Potatoes Used for Processing*	
			% of Potatoes for Processing in Canada
	000's cwt.	000's cwt.	
1960	n.a.	777	n.a.
1961	3,588	1,185	33.0
1962	5,323	1,156	21.7
1963	4,311	1,095	25.4
1964	4,825	1,299	26.4
1965	5,942	1,542	26.0
1966	n.a.	1,798	n.a.

The figures of Table 13 show that between 1961 and 1965 Ontario potatoes provided one-quarter to one-third of the total volume of potatoes processed in Canada. The available data do not indicate the volume or the percentage of Ontario potatoes used by Ontario-based plants. However, on the basis of the information obtained from processors, it is safe to assume that the bulk of Ontario potatoes was processed within the Province.

The relative importance of processing potatoes in Ontario is steadily increasing. Table 14 suggests that while in 1960 Ontario potatoes used for processing accounted for 8.6 per cent of total potato production of the Province, the comparable figure for 1966 was 17.9 per cent.

*Source: Ontario Department of Agriculture.

Table 14

ONTARIO POTATOES USED FOR PROCESSING, 1960 TO 1966

<u>Year</u>	<u>Ontario Potato Production</u>	<u>Ontario Potatoes Used for Processing</u>	
	000's cwt.	000's cwt.	Per Cent of Ontario Potatoes
1960	8,935	777	8.6
1961	9,819	1,185	12.1
1962	9,581	1,156	12.1
1963	9,792	1,095	11.2
1964	10,494	1,299	12.4
1965	10,584	1,542	14.6
1966	10,003	1,798	17.9

Potato Processing Industry in Ontario

The Census of Manufactures covered 13 Ontario establishments which processed potatoes in 1965. The Census figures (see Table 16) suggest that in 1965 the value of shipments of processed potato products in Ontario was about \$17 million, and the value added was estimated at \$8 million for the same year.

The potato processing industry of the Province is highly concentrated. In 1965, three establishments in the size group \$1,000,000 and over produced about 79 per cent of the total value of shipments of the whole potato processing industry in Ontario. The high degree of concentration in the processing industry has considerably influenced both the geographic pattern and the structure of potato growing in Ontario (see Table 16).

Processed Potato Products in Ontario

The chief forms of processed potatoes at the present time are: potato chips, frozen french fries, dehydrated (flakes, granules) and pre-peeled potatoes. Table 15 shows the quantities and value of shipments of goods manufactured by Ontario potato processors in 1965.

Table 15

SHIPMENTS OF GOODS MANUFACTURED BY THE
ONTARIO POTATO PROCESSORS, 1965

<u>Description</u>	<u>Quantity</u>	<u>Value</u>	
	000's lbs.	\$000's	%
Potato Chips	19,148	12,766	74.7
Frozen French Fries*	n.a.	n.a.	
Dehydrated*	n.a.	n.a.	
Pre-peeled*	n.a.	n.a.	
Not Specified*	n.a.	n.a.	
Total	38,196	17,083	

*Confidential, to avoid disclosure.

Table 16

PRINCIPAL STATISTICS OF ONTARIO POTATO PROCESSORS

Classified by Size Group Based on Value of Shipments of Goods of Own Manufacture, 1965

Size Group	Establish- ments No.	Production and Related Workers				Cost of Fuel and Elec- tricity	Cost of Materials and Supplies	Value of Shipments of Goods of Own Manu- facture	Value Added
		Number	%	Man- Hours Paid '000	Wages				
			%	'000	%	%	\$'000	%	%
Less than \$100,000	3	11	23.1	18	1.3	2	115	1.4	1.1
\$100,000 to 499,999	4	48	30.7	117	8.8	15	356	4.3	6.2
\$500,000 to 999,999	3	82	23.1	185	13.9	67	1,379	16.8	13.5
\$1,000,000 and Over	3	385	23.1	1,015	76.0	286	6,354	77.5	79.2
TOTALS	13	526	100.0	1,335	100.0	370	8,204	100.0	100.0

Potato Chips

Between 1955 and 1965 the annual manufacture of potato chips in Canada increased from 20,203,000 lbs. to 50,036,000 lbs. In the same period, per capita consumption of potato chips doubled (from 1.3 to 2.6 lbs.).

Table 17

POTATO CHIPS MANUFACTURED IN CANADA, 1955 TO 1965*

<u>Year</u>	<u>Total</u> 000's lbs.	<u>Per Capita</u> lbs.
1955	20,203	1.3
1956	19,949	1.2
1957	21,929	1.3
1958	25,789	1.5
1959	36,292	2.1
1960	38,711	2.2
1961	39,711	2.2
1962	50,465	2.7
1963	47,762	2.5
1964	51,946	2.7
1965	50,036	2.6

The manufacture of potato chips is the most important sector of the potato processing industry in Ontario. The data of the Census of Manufactures indicate that in 1965 potato chips accounted for about 75 per cent of the total value of the goods manufactured by Ontario potato processors (see Table 15). In the same year, the quantity of potato chips manufactured in the Province amounted to 19,148,000 lbs. and accounted for 38.7 per cent of the total Canadian production.

Information on other processed potato products cannot be disclosed because the statistical data are confidential. Thus this chapter will mainly deal with potato chips with occasional references to other processed potato products.

Special Problems of the Potato Chip Industry

Compared to other processors of fruits and vegetables, the potato chipper is in a unique position. His product is extremely perishable and has practically no shelf life because it cannot yet be economically packaged and stored over long periods. His raw material requirements are unusual, to the extent that he cannot take the everyday run of table potatoes, of however high quality they may be for table purpose, and process them into chips. In order to gain popular acceptance, the chipper's product must always be light in colour

*Source: The Canadian Potato Chips Association.

and pleasant to taste. These qualities can only be assured if chippers are able to obtain a potato which is high in solid content and low in reducing sugars and moisture. The requisites for obtaining high quality potato chips are:

- a) Specific Gravity: In selecting potatoes for processing into chips it is exceedingly important that tubers of high specific gravity or dry matter content be chosen. The specific gravity of potatoes varies considerably among varieties grown under similar conditions and within the variety when grown under different soil and environmental conditions.
- b) Maturity: Fully mature potatoes are highly desirable for chipping. Usually as potatoes become more mature they increase in specific gravity. Maturity can be best obtained by early planting, late harvesting and killing of potato vines rather slowly.
- c) Proper Fertilization Practices: Potatoes which have been heavily fertilized, particularly with nitrogen, are usually of lower specific gravity than those receiving lesser amounts of these nutrients.
- d) Selection of Potato Varieties: Selection of good potato varieties for processing into chips is important. Some varieties inherently accumulate sugar and other chemical constituents that contribute to dark colour in chips; other varieties, such as Kennebec, Chippewa, Netted Gem, and Sebago, usually produce chips of good quality and colour.

Adequate Storage

Storage temperature is one of the major problems of potato chip manufacturers. Potatoes stored at temperatures under 50° are subject to a chemical reaction changing some of their starch content to sugar. As the temperature is lowered this conversion action is accelerated, and when chips are made from these potatoes, they have a brown colour and burned taste, which is unacceptable to the consumer. While the reconditioning period at high temperatures tends to reverse the chemical process, sugar is not reduced to its original content and in some varieties it is difficult to reduce it at all. All this means that for chipping great care must be taken to see that the storage temperature does not fall below 50°.

The relatively high storage temperature favours the premature sprouting of potatoes. In order to delay sprouting, chemical sprout inhibitors (both on the field and in storage), micro-wave treatment, atmosphere control, etc., are used with various degrees of success. However, as a rule, in late April-early May, storage potatoes become unsuitable for chipping. The potato chipping industry thus has to import from the U.S. its needs for about three months of the year. The potatoes imported are both expensive and immature. A solution to the storage problem appears to be a high priority issue for the potato chipping industry.

The Supply of Potatoes for Processing

Potato processing companies can get their raw material in the required quantity, quality, and time from three sources: vertical integration, contract buying and purchases on the open market (both domestic and U.S.). Contract buying is by far the most important because processors can be sure of getting potatoes according to their own quality requirements, in the quantities needed and at the time required. Growers, in turn, know they have a definite market for at least a certain portion of their produce and are more inclined to make capital investments for mechanization.

Vertical Integration

Among the potato processing companies only Salada Foods Ltd. grows potatoes for its own use.

The Company opened its processing plant in Alliston nine years ago. To ensure sufficient supply in the first year, the Company bought and farmed 140 acres in the area. This farming operation gradually increased so that it now covers over 2,000 acres with about 1,600 acres of potatoes.

The management of the Company defines the purpose of this large potato enterprise as follows:

- a) securing supply (both in terms of quality and quantity);
- b) influencing purchase prices of potatoes; and
- c) introducing and demonstrating new production techniques.

While the results of the first two aims cannot be evaluated because of the confidentiality of the corresponding statistics, it is evident that the company was very efficient in achieving the last aim.

The Salada farm became a testing ground for new production techniques. It introduced the bulk handling of seed and fertilizer, heavy mechanization (the first six-furrow plough, self-propelled harvester), and it applied new planting and spraying methods.

The Alliston area is eminently suited to potato growing, and with an annual 6,000 - 7,000 acres under cultivation represents 12 - 15 per cent of the total potato acreage of the Province. The local growers watched closely, critically, and they gradually followed Salada's example in applying new technology.

Contract Buying

Most of the potatoes used for processing are produced on the basis of a contract between the processor and the grower. Under the terms of the contract, growers have a guaranteed minimum income which is settled in advance each season. This gives them a better line of credit at the bank and allows them to invest in new equipment, machinery and storage. Processors, on their part, can control the cost, quality and continuity of supply of their raw material. The terms and specifications of the contracts of different companies show a considerable variety. However, all of these contracts contain provisions on size, specific gravity, production techniques, delivery, inspection and grading. (A model contract between a processing company and a grower is reproduced in Appendix III.)

The Influence of Contracts on the Size of Farming and Mechanization

Potato growing is a hazardous operation. Prices tend to fluctuate widely as do farmers' incomes. The contract system has reduced a number of uncertainties and made possible specialization and large-scale mechanization. Even if growers contract just a part of their potato acreage and sell the rest on the market they need less reliance on diversified production - so-called insurance crops - and can increase their potato acreage.

Increased potato land both allows and requires mechanization. In the last few years the use of seed cutters, four-row planters, turbine sprayers, weeders, and harvesting equipment has significantly increased. In the Alliston area alone, there are about 14 to 16 potato harvesters which cost \$14,000 - \$16,000 each. Many producers have expanded their storage facilities as well.

Processors prefer to contract large-scale growers; it requires less administration and provides better co-ordination. In 1966, the growers in one of the Province's major potato growing areas having contracts with processing companies were classified as follows:

Table 18

CLASSIFICATION OF GROWERS BY SIZE OF FARMS

<u>Size of Farm in Acres</u>	<u>Growers</u>		<u>Contracted Area</u>	
	No.	Per Cent	Acres	Per Cent
More Than 200	2	7.7	420	17.5
101 - 200	8	30.8	1,000	41.7
50 - 100	14	53.8	900	37.5
Less Than 50	2	7.7	80	3.3
Total	26	100.0	2,400	

Another tendency closely related to the previously observed developments is that the average size of the contracted acreage per farm is continually increasing. Comparing the distribution of the contracted area of one large processing company, it appears that in 1963, 80 per cent of potato contracts concerned an area under 50 acres each, but the comparable figure for 1966 was 55 per cent.

Table 19

DISTRIBUTION OF POTATO CONTRACTS OF A LARGE
PROCESSING COMPANY, BY SIZE, 1963 AND 1966

<u>Potato Contracts Size</u>	<u>Per Cent of Total Contracted Acreage</u>	
	<u>1963</u>	<u>1966</u>
More Than 200 Acres	3	5
101 - 200 Acres	7	15
50 - 100 Acres	10	25
Less Than 50 Acres	80	55
Total Acreage Contracted	3,000	4,900

The contract system has led to the emergence of a new type of grower who operates a 300 - 800 acre farm specialized in potato production. This grower is well informed on the overall situation of supply and demand, and on prices in Toronto and other major cities. Because of his modern storage facilities he can wait for a strengthening of the market in periods of depressed prices.

The Alliston area has a number of potato growers of this stature. A typical representative of this group is a farmer who operates a 400-acre farm,

with an average of 300 acres of potatoes a year. He sells 60 per cent of his potatoes to a potato processing company on a contract basis; the rest of his produce goes to the fresh market. He has a heavy investment in machinery and equipment and operates a harvester (two-row), automatic seed cutter, four-row planter, three trucks, two tractors and a sprayer.

This grower built a storage plant two years ago with a capacity of 125,000 (75 lb.) bags. Two-thirds of the storage space is occupied by his own potatoes, the rest is rented to the processing company. The book value of the storage is \$100,000, and the total investment in land, buildings, machinery and equipment is estimated at \$350,000.

The grower estimates his cost of production of potatoes at \$265 per acre for 1966. Gross return on potatoes per acre is estimated at \$363, yield was 285 (75 lb.) bags, average price per bag \$1.27. Deducting costs of production, his net return per acre was \$98, totalling \$27,000 on his 300 acres of potatoes. This example, however, cannot be generalized even for the Alliston area, which has the largest concentration of specialized potato growers in Ontario.

Table 20 suggests that in South Simcoe County, which includes Alliston, 44 growers out of 64 had a potato area of less than 100 acres which is generally considered by experts as the minimum required for the efficient application of modern machinery and equipment.

Table 20

POTATO ACREAGE AND NUMBER OF GROWERS,
SOUTH SIMCOE COUNTY*, 1964

	<u>Growers</u>		<u>Total Area</u>		<u>Average Acre Per Grower</u>
	No.	%	Acres	%	
Less Than 50 Acres	26	41.3	536	8.3	20.6
50 - 100 Acres	18	28.5	1,350	20.9	75.0
100 - 200 Acres	10	15.9	1,575	24.4	157.5
Over 200 Acres	10	14.3	4,016	46.4	401.6
Total	64	100.0	7,477	100.0	116.8

*Including Alliston.

Note: Salada Farms excluded.

Source: Special computation, Ontario Department of Agriculture.

The Impact of the Potato Processing Industry on the Geographic
Pattern of Potato Growing

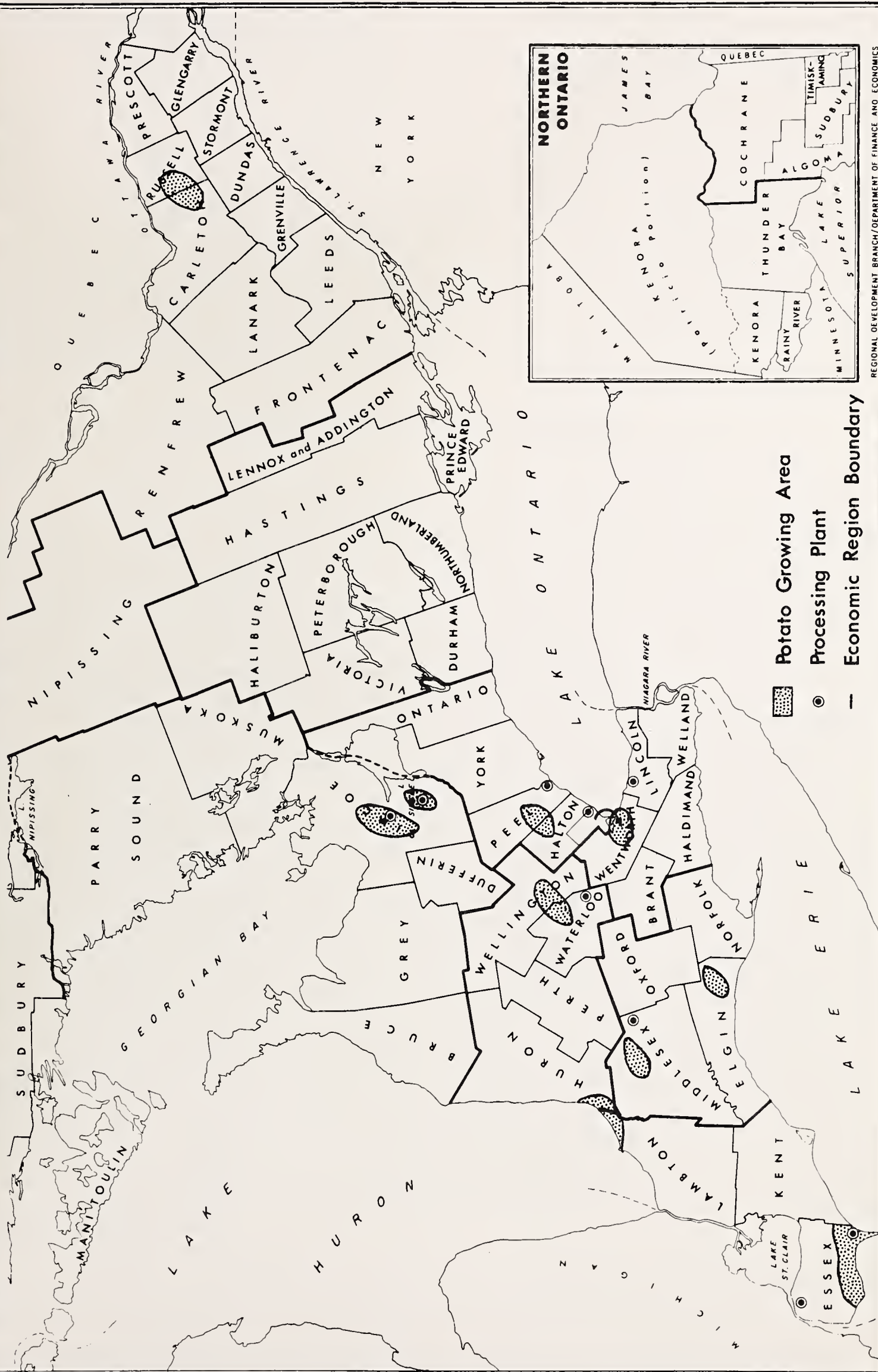
Potato growing in Ontario is becoming more and more concentrated (see Table 21).

Table 21

POTATO ACREAGE IN ONTARIO AND IN SELECTED COUNTIES, 1951 TO 1966

Year	Total Ontario Province	Simcoe		Dufferin		Essex		Wentworth		York		Total of Selected Counties	
		Acres	Per Cent of Ontario	Acres	Per Cent of Ontario	Acres	Per Cent of Ontario	Acres	Per Cent of Ontario	Acres	Per Cent of Ontario	Acres	Per Cent of Ontario
1951	54,900	4,789	8.7	2,472	4.5	3,953	7.2	2,098	3.8	2,571	4.7	15,883	28.9
1952	56,100	4,800	8.6	2,800	5.0	3,400	6.1	1,700	3.0	2,530	4.5	15,230	27.2
1953	63,000	4,500	7.1	2,800	4.4	5,400	8.6	2,200	3.5	2,900	4.6	17,800	28.2
1954	56,500	4,900	8.7	2,200	3.9	5,000	8.8	2,000	3.2	2,950	5.2	17,050	29.8
1955	55,900	5,300	9.1	1,830	3.2	5,500	9.5	1,830	4.5	2,740	4.7	17,200	31.0
1956	53,700	5,729	10.7	2,953	5.5	4,766	8.9	2,431	4.3	1,471	2.7	17,360	32.1
1957	54,000	5,500	10.0	3,100	5.6	5,000	9.1	2,350	4.5	1,670	3.0	17,620	32.2
1958	54,000	6,050	10.7	3,400	6.0	4,800	8.5	2,540	4.1	1,520	2.7	18,310	32.0
1959	50,000	7,100	13.4	3,800	7.2	3,330	5.3	2,160	4.1	1,400	2.6	17,790	33.6
1960	51,000	7,700	12.6	4,300	7.0	4,200	6.9	2,500	4.1	2,020	3.3	20,720	33.9
1961	51,500	9,238	18.0	3,456	6.7	4,798	9.3	2,878	5.6	2,310	4.5	22,680	44.1
1962	49,900	9,300	18.6	3,300	6.6	4,700	9.4	2,950	5.9	2,600	5.2	22,850	45.7
1963	51,000	10,300	20.2	3,000	5.9	5,100	10.0	3,000	5.9	2,340	4.6	23,740	46.6
1964	53,000	11,300	21.3	3,000	5.7	5,400	10.2	3,200	6.0	2,500	4.7	25,400	47.9
1965	56,000	11,900	21.3	3,700	6.6	5,900	10.5	3,500	6.3	2,800	5.0	27,800	49.7
1966	52,100	12,799	24.6	3,064	5.9	5,329	10.2	2,698	5.2	2,324	4.5	26,214	50.4

MAJOR POTATO GROWING AREAS & IMPORTANT PLANTS IN ONTARIO



In 1951, Simcoe, Dufferin, Essex, Wentworth and York Counties accounted for 28.9 per cent of total potato acreage in Ontario. In 1966, the comparable figure was 50.4 per cent.

The map showing the "Location of Potato Processing Plants in Ontario" indicates that most of the processing plants operate in strategic points in or close to the major potato growing areas in order to reduce transportation costs of their bulky raw material. As already shown, growers in these areas responded to the increasing demand by expanding their potato acreages. The interaction of these two factors has eventually contributed to the changes experienced in the geographic pattern of potato growing in the Province.

Problems Between Processors and Growers

Potato processors and growers are generally satisfied with the contract system though the growers seem to have fewer complaints than the processors. The complaints of processors centre around what they call "quality problems and considerations". Potato growers, on their part, feel that due to increasing costs of inputs they need higher prices for their products.

A processor, summarizing some of the problems, indicated that there was a consistent lack of potatoes with good solids (the ideal solid content being 1.075), that there was extensive damage due to mechanical injury, and that the percentage of small potatoes which were useless for potato chips or french fries was too high. Other problems were created by stones picked up with the potatoes, and defects such as hollow heart, sunburn (particularly in the Kennebec variety), scabs, growth cracks, off-shape and rot. Rot can be a very significant problem because of the large quantities the processors are forced to store for long periods of time. Only ideal temperature and storage facilities with air circulation will prevent serious breakdown where rot is present in a pile. Even so, large quantities of healthy potatoes can quickly be contaminated by rot.

A number of growers has taken steps to organize a marketing board or some form of marketing committee which would represent their collective interests. They know that growing potatoes for processing requires sophisticated production methods and long experience. Despite all the complaints about the quality of potatoes, processing companies need reliable, specialized growers as much as the growers need them. Thus the bargaining position of growers who produce processing potatoes is relatively strong.

Exports and Imports of Potato Products in Canada and Ontario

Table 22 indicates that exports of frozen potato products amounted to \$1.9 million in 1965. The United Kingdom is the most important market for Canadian frozen potato products (67.8 per cent of total Canadian exports in 1965), followed by Australia (21.2 per cent). Potato chips and mashed potato exports are not listed.

Table 22

DOMESTIC EXPORTS OF FROZEN POTATO PRODUCTS BY COUNTRY, 1965

<u>Country</u>	<u>Pounds</u>	<u>Per Cent of Total</u>	<u>Value \$</u>	<u>Per Cent of Total</u>
United Kingdom	8,678,496	67.8	1,307,214	67.8
Germany (West)	-	-	-	-
Australia	2,836,477	22.1	409,662	21.2
United States	631,963	4.9	103,483	5.4
All Other Countries	<u>660,742</u>	<u>5.2</u>	<u>107,737</u>	<u>5.6</u>
Total	12,807,678	100.0	1,928,096	100.0

Source: D.B.S., "Domestic Exports by Commodities and Countries", No. 65-004, December, 1965.

Imports of processed potato products are insignificant. Table 23 suggests that in 1965 total value of imports was less than \$300,000.

Table 23

IMPORTS OF POTATO PRODUCTS BY COUNTRY AND COMMODITY, 1965

<u>Potato Products</u>		<u>Pounds</u>	<u>%</u>	<u>Value \$</u>	<u>%</u>
Potato Products, Frozen	U.K.	-	-	-	-
	U.S.A.	<u>220,302</u>	<u>100.0</u>	<u>99,949</u>	<u>100.0</u>
	Total	220,302	100.0	99,949 (36.9%)	100.0
Instant Mashed Potatoes	U.K.	-	-	-	-
	U.S.A.	307,484	82.6	84,805	85.5
	Other	<u>64,944</u>	<u>17.4</u>	<u>14,332</u>	<u>14.5</u>
	Total	372,428	100.0	99,137 (36.6%)	100.0
Potatoes, Dried, n.e.s.	U.K.	9,000	3.6	4,073	5.7
	U.S.A.	227,936	90.7	64,930	90.3
	Other	<u>14,310</u>	<u>5.7</u>	<u>2,852</u>	<u>4.0</u>
	Total	251,246	100.0	71,855 (26.5%)	100.0
Total Imports				270,941 (100.0%)	

Source: D.B.S., "Imports by Commodities and Countries", No. 65-007, December, 1965.

Ontario's share in the export-import trade of potato products is even less significant. In 1966, Ontario imported 66,300 pounds of dried potatoes and 387,600 pounds of frozen potato products from the U.S., with a total value of \$78,000, while in the same year the Province exported to the U.S. 170,700 pounds of frozen potato products valued at \$22,700.*

THE FUTURE OF THE ONTARIO-BASED POTATO PROCESSING INDUSTRY**

Both production and consumption of processed potato products is steadily increasing in Canada. With the development of potato processing in other parts of Canada, it would seem that competition will become very keen. For instance, the Carnation plant in Manitoba is expanding very rapidly. Its main product is frozen french fries and they are carrying out an aggressive advertising and distribution program. The same applies to Alberta, particularly to the Taber and Vauxhall areas. In these areas, the Netted Gem, a variety with high dry matter, can be grown very satisfactorily. In New Brunswick, the McCain Organization in East Florenceville has absorbed a large share of the market. However, Ontario has the distinct advantage of being close to a market which comprises a large portion of the Canadian population. Moreover, it is expanding at an impressive rate.

Our affluent society is using more and more potato products. Chips are in demand for parties, toppings for salads, etc. French fries are in special demand with steak and hamburgers. And with the refrigeration facilities available in homes today, frozen french fries can be kept in good condition and used periodically.

Potato peeling by many householders and families has become old fashioned. With people living in apartments, the demand for instant mashed potatoes will increase. However, it should be realized that the competition of instant rice and other instant products will have an effect on the volume of potatoes. Potato chip makers consider the tariff on imported potatoes (raw material) as an important obstacle to the expansion of their business.

The Canadian Potato Chip Association, in a brief to be presented to the Federal Government recently, asked that the 37½ cent per hundredweight duty be passed on to manufacturers as a rebate while supplies are unavailable in

* D.B.S., External Trade Division.

**Based on information received from the Ontario Food Council.

Canada. Periods of short supply varied but could occur between May 15 and August 15. Although there are reserves of Canadian potatoes during this period, they are not of sufficiently good quality for chips.

Another problem facing the industry is an increase in rail freight rates. Freight rates have been increased on light bulky items such as potato chips in less than carload lots by between 150 and 280 per cent. In addition to increasing transportation costs, the cost of some supplies has risen. Despite these problems and increasing competition from cereal-type snacks, the industry is optimistic and aims to double capacity in the next decade.

CHAPTER IV

MARKETING OF TABLE POTATOES IN ONTARIO

Experts estimate that approximately 70 - 75 per cent of Ontario-grown potatoes are sold as table potatoes. The marketing of table potatoes in Ontario has undergone many changes in the past decade. These changes are characterized by the increasing scale of operation (both at farm level and in retail trade), the improvement in farming technology and the development of more rapid and efficient transportation and communication services. Other important changes are the size of supermarkets, which at present cover an estimated 60 - 65 per cent of total table potatoes sales at retail level, and the development of packaging techniques.

The purpose of this chapter is to describe and assess the main aspects of the marketing of table potatoes in the Province, while emphasizing the impact of the changing pattern of marketing on the structure of the potato growing industry. Relevant information was obtained primarily by way of personal contact (interviews and correspondence), backed by official statistical data wherever available.

Marketing of Table Potatoes at Farm Level

The system of marketing table potatoes at farm level varies considerably, depending upon size of operation, location, personal ability and inclination of the grower.

- (a) A small-scale grower (less than 50 acres) usually has no more than a one-row potato digger. He fills 75 lb. bags on the field and sells directly to the trucker.
- (b) The same type of grower delivers the potatoes in bulk to his farm storage (which is usually a converted barn), provides some grading and sells his produce, as a rule, in 75 lb. bags to the trucker, or local stores.
- (c) Under another frequently used method the grower delivers and sells his produce to a (usually farmer-owned) packing station, where the potatoes will be graded and packed in 10, 25 and 50 lb. bags.
- (d) Farmers' markets also have some importance in potato marketing. The largest of these farmers' markets is located at the Ontario Food Terminal and provides parking and selling space for 350 vehicles.

Most of the produce sold on the Toronto farmers' market originates within a 50-mile radius of the market, but occasionally growers come from as far as Leamington. In 1963, the estimated 3,280 tons of potatoes sold on the farmers' market of the Ontario Food Terminal represented six to seven per cent of total potatoes grown in the Province.

The possibilities in selling potatoes are even more numerous. Larger growers have their own grading stations and sell their produce in 10, 25 and 50 lb. bags to local independent grocers and small chain stores.

One of the biggest potato growers in the Province, with an area of 700/800 acres has his own sales organization with a full-time sales manager and storage facilities for 320,000 (75 lb.) bags. He washes, packs and sells his own produce directly to chain stores, dealers and institutions.

Marketing Co-operatives in Essex County

In Essex County, especially in the area parallel to the shores of Lake Erie, the early springs facilitate the production of a variety of early crops. The shipment of early potatoes in the Harrow-Leamington area usually commences in July - several weeks before other potato-growing areas in the Province. Time is the major factor affecting prices in this period of the year. In 1966 the prices of early potatoes in the Leamington area varied as follows:

<u>Date</u>	<u>Price</u> (\$/25 lb. bag)*
June 30	2.50
July 8	2.25
July 15	1.75
Aug. 3	1.75
Aug. 23	1.70
Sept. 7	1.65

*Less 10 per cent commission to broker and
350/75 lb. bags transportation cost to Toronto.

Growers in this area complain that potato growing is seriously affected by the unorganized character of the market and instability of prices. Supply of produce varies unpredictably from day to day in response to weather conditions. Early potatoes being perishable, an increased supply over a period

of a few days quickly translates itself into a downward pressure on prices. Processing potatoes are generally grown under contracts written between growers and processors in advance of planting. Early potatoes, on the other hand, are subject to abrupt changes in price behaviour - even within a week - that can result not only from the erratic local supply but from the seasonally oriented demand, and from the competition of other potato growing areas (especially Port Stanley) in addition to a large unknown factor of U.S. imports. During 1967 Virginia potatoes were brought on the market a month before the Essex potatoes.

The marketing co-operatives of the area contribute to the improvement of the marketing situation, to a certain extent. The potato growers' co-operative in Harrow acts on behalf of 60 growers, who represent the great majority of the local potato growers.

The services of the co-operative include the grading, packing and merchandising of potatoes. Toronto (60 per cent of total sales), Halifax (20 per cent) and Montreal (15 per cent) constitute the main markets. A relatively small volume is sold to truckers.

In the main season - July to September - the co-operative contacts the major customers daily, obtains information on prices and demand, and advises the growers accordingly as to the required volume of shipments to the central warehouse.

Leamington Vegetable Co-operative operates in a similar way. However, this co-operative represents only a minority of the local potato growers. There are ten private shippers in the area, working independently or on behalf of chain stores and major dealers and stores. There is keen competition on the local market. Sometimes six of the ten shippers may contact the same broker or dealer in Toronto and, conversely, several farmers may attempt to sell their produce to the same shipper. This two-way competition generally results in depressed prices. It only requires one local grower, willing to sell at a lower price than all others, to establish a price for the whole local market.

Marketing Group in Port Stanley Area (Elgin County)

There are approximately 25 potato growers in the area of Port Stanley, Union and Aylmer, producing a total of 1,000 - 1,200 acres of potatoes. The bulk of the area's potatoes is marketed between mid-July and early August, i.e., two to three weeks later than the Essex potatoes, and a few weeks earlier than

the remainder of the Province. Such a situation offers certain advantages to the local growers, who sell some 60 per cent of their produce on the fresh market, while the balance goes to processing companies.

The leading potato grower of the area operates a 300-acre farm and acts as the local potato growers' representative. He sells his own and a great amount of local potatoes to major dealers, and to chain stores through brokers.

Packing Houses

An estimated 50 - 55 per cent of the total volume of Ontario-grown table potatoes is sold to packing houses (grading stations), while some two-thirds of this volume is handled by five to six major operators with a plant capacity of 5,000/10,000 (75 lb.) bags each per week.

Most of the packing houses (both small and large) are owned by potato growers who utilize them for their own produce, and also for the handling of potatoes purchased from other growers.

The services of the packing houses include grading (under the supervision of a government inspector), packing in 10, 25, 50 and 75 lb. bags, and selling. Generally, the major packing houses serve regular customers. Volumes required by buyers are conveyed weekly, whereas prices fluctuate on a day-to-day basis. The customers of the packing houses are brokers, dealers, institutions and (probably most important) the chain stores.

One of the major packing houses has one large grading unit, employing 30 workers from August to early November. The Company owns and operates a 500-acre potato farm and also has financial control over a neighbouring farm of similar size. These two farms provide about half of the total volume handled and sold by the company, while the balance is purchased from 15 - 18 Ontario growers. Also, the Company sells P.E.I. potatoes during the winter time. This packing house supplies directly to chain stores, to a dealer in Northern Ontario and to potato processors on a minor scale. Another major grower-packer sells to two customers only - both corporate chains. The Company grows about 1,000 acres of potatoes, operates controlled temperature warehouses,

possesses its own shipping fleet of 24 delivery trucks, and purchases, handles and resells Ontario and P.E.I. potatoes. A third large packing company represents a border case between the grower-packer and the vertically integrated operator. It owns and operates a 300-acre farm and produces potatoes on some 100 acres. In addition, the Company operates a potato chip plant and acts on behalf of a corporate chain as packer-dealer.

Truckers

The trucker makes his purchases directly from the farmer, and usually follows his own schedule. He sells the produce to institutions, restaurants, independent grocery stores, wholesalers and, occasionally, at the farmers' market in Toronto.

Primary Wholesalers

Primary wholesalers are initial recipients of produce in the market. There are only five primary wholesalers in the Province specializing in potatoes.*

One of the largest independent firms in this category is S. Hisey and Son Ltd., located at the Ontario Food Terminal. The firm purchases potatoes from truckers at the Terminal or buys them directly from growers, occasionally on a commission basis. In October the firm begins to sell P.E.I. potatoes at an increasing rate. By November, however, no Ontario potatoes are sold at all. Each week, the firm serves approximately 300 customers, such as individual grocery stores, secondary wholesalers, hotels and other institutions - and occasionally chain stores.

National Grocers Ltd. is a wholesale firm with a Toronto-based head office and 26 branches throughout Ontario. The central office issues daily market bulletins indicating price quotations, but the local branches hold the authority to buy directly from growers and sometimes from dealers. The branches purchase potatoes already graded and packed. In order to work efficiently they prefer to contact rather large-scale growers who are able to deliver at least a truck load of potatoes. Their customers tend to be individual retailers, institutions and small chain stores.

*A great number of small firms purchase most of their produce from primary wholesalers for distribution.

Dealers

Dealers sell potatoes to retail stores (individual and chain stores). Five of them are located at the Ontario Food Terminal, and a further six in other parts of the Province (London, Hamilton, Oshawa, Shelburne). In addition, a large number of local shippers, buying potatoes directly from growers and selling to chain stores, large dealers and truckers, etc., may be classified in this category.

The marketing pattern and size of operation of the potato dealers vary considerably. For example, G. Smith Produce Company (at the Ontario Food Terminal) usually sells to chain stores and independent retailers, and purchases directly from growers. At present, the Company has about 20 grower contacts in Ontario. These growers are generally small-scale operators with 10 - 20 acres of potatoes.

Farley Produce (London), another important dealer, operates on a much larger scale, receiving potatoes in the following areas:

- a) Leamington (from local shippers)
- b) Ridgetown (from local dealers)
- c) Port Stanley (from local growers)
- d) Burford (directly from farmers)
- e) Grand Bend (from its own packing house)
- f) Ancaster (from Aurley Marshall, a local grower with 600 acres of potatoes).

Farley Produce's customers comprise chain stores in the London-Kitchener-Brantford area. The Company buys huge amounts of potatoes in bulk, and does grading and packing in its own packing houses, located in London and Grand Bend.

Brokers

The five brokers specializing in potatoes have their offices at the Ontario Food Terminal. Brokers arrange transactions, on a commission basis, between buyers located primarily in Toronto, and shippers and growers from various areas, including the Maritimes. Their most important clients are chain stores, who represent 60 - 70 per cent of the total volume of transactions. Brokers normally prefer to deal with shippers and only secondarily with large-scale growers.

Usually, the chain stores' produce buyers contact the brokers, indicating the required volume over the next two - three days. Chain stores may or may not specify the purchase price in advance. The next step is for the brokers to contact local shippers and growers, after which they report back to the chain stores, and again to local shippers, growers etc.

Such an operation requires experience, flexibility and speed on the part of the broker. Sometimes they contact their clients (buyers and sellers) several times, with alternative offers for concluding a deal.

Corporate Chains and Voluntary Groups

According to Table 24, in 1966 chain stores accounted for 53.4 per cent of total annual sales of grocery and other food stores in Ontario.

Table 24

ANNUAL SALES OF GROCERY AND OTHER FOOD STORES, ONTARIO, 1961 TO 1966

<u>Year</u>	<u>Chain Stores</u>		<u>Independent*</u>		<u>Total</u>	
	\$ million	%	\$ million	%	\$ million	%
1961	867	52.9	772	41.1	1,639	100.0
1962	887	52.3	809	47.7	1,696	100.0
1963	947	52.8	848	47.2	1,795	100.0
1964	1,008	53.0	892	47.0	1,900	100.0
1965	1,096	54.3	923	45.7	2,019	100.0
1966	1,146	53.4	1,002	46.6	2,148	100.0

*Including 165 I.G.A. stores (independent voluntary groups) in Ontario.

Source: D.B.S. Retail Trade.

At present, the corporate chains and voluntary groups sell an estimated 60 - 65 per cent of the total volume of table potatoes in Ontario. This estimate may vary among experts, but all agree that corporate chains and voluntary groups have an important influence not only over the retail trade but also over the agriculture sector. The impact on the structure and prospect of potato growing in Ontario is clearly identifiable. For this reason, the purchasing and merchandising patterns of the chain stores and voluntary groups will be analyzed in some detail in the study.

Present analysis includes several corporate chain store organizations and one wholesale firm that serves affiliated independent retail outlets. Most of these firms have warehouses in Metropolitan Toronto to serve

retail outlets both in the Metropolitan area and in other parts of the Province.

The purchasing pattern of corporate chains and voluntary groups varies significantly among the individual firms as regards the quantity of produce acquired. The purchasing pattern of the individual firms takes the following form:

a) The purchasing and merchandising of one of the largest corporate chains is almost completely centralized. The chief produce buyer takes orders from the retail outlets in Toronto and from the remainder of the Province two to three times a week. Approximately 90 per cent of the required volume of Ontario potatoes is delivered by a single packing house, and the rest by another large-scale packer. During the winter season, Maritime potatoes are purchased through brokers.

Potatoes are usually delivered to the corporate chain's central warehouse already re-graded and packed and are subsequently shipped to retail stores in Toronto and other parts of Ontario. Some local stores are authorized to purchase directly from growers and dealers at a price suggested by head office.

b) Another corporate chain has several geographic divisions in Ontario. The produce purchase department of the Toronto division acquires about 90 per cent of total requirements (both Ontario and Maritime potatoes) from a large grower-packer, and another packing firm delivers the balance. The chain's other divisions purchase potatoes from local growers, packer-growers and from local dealers. As a general rule, all the divisions of this chain prefer to contact large-scale growers, packers and dealers.

c) A third corporate chain follows a different procedure again. This Company has no permanent suppliers. Shifting from one area of the Province to another, the produce buyer acquires potatoes on a daily or weekly basis, contacting several brokers, dealers, wholesalers and packers. It appears, however, that two major distributors are the most important contacts. The chain operates a warehouse for grading and packing potatoes. Some of the potatoes are shipped directly to retail outlets. Two other chain stores included in the study were found to have very similar purchasing and distribution practices.

d) Included in our study was a large wholesale firm that serves affiliated retail outlets. Both purchasing and distribution operations of this firm are centralized. Potatoes purchased by the central office are shipped to the central warehouse. After re-grading and packing into 5, 10, 15, 25 and 50 lb. bags, the produce is delivered by trucks owned by the company to the local stores.

This firm acquires Ontario potatoes from:

- a) Leamington (two to three local shippers working for the Company),
- b) Port Stanley (through brokers),
- c) Alliston-Beeton area (major packing houses),
- d) Ancaster (a large-scale grower), and
- e) occasionally from other parts of the Province.

In addition, the Company operates a packing house not far from Toronto, which buys Ontario potatoes on a small scale.

The Effect of Corporate Chain Stores on Farm Prices of Potatoes

The marketing pattern of Ontario potatoes (at farm level) follows a well-known course. During late June and early July, when growers commence their harvesting of early potatoes, prices reach maximum levels. As the harvest proceeds in Port Stanley, Ancaster and Alliston, supply increases, prices decline and drop to a minimum by late fall.

By this time, the bulk of Ontario potatoes is usually sold. The farmers place the unsold potatoes in storage. In October, Maritime potatoes enter the Ontario market and gradually secure a dominating position. Many retailers and consumers prefer Maritime (especially P.E.I.) potatoes to Ontario produce, which re-appears in small quantities in January.

Table 25 suggests that average monthly farm prices of Middlesex potatoes, over the periods 1951-55 and 1961-65, followed the pattern described above.

Table 25

FARM PRICES OF MIDDLESEX POTATOES (ONTARIO NO. 1)

	1951-1955	1961-1965
	<u>Average</u>	<u>Average</u>
	\$/cwt	\$/cwt
January	2.37	2.23
February	2.22	2.32
March	2.31	2.23
April	3.07	2.38
May	3.72	2.17
June	3.38	3.00
July	3.21	n.a.
August	2.77	1.97
September	2.23	1.79
October	2.15	1.84
November	2.38	2.01
December	2.35	2.06

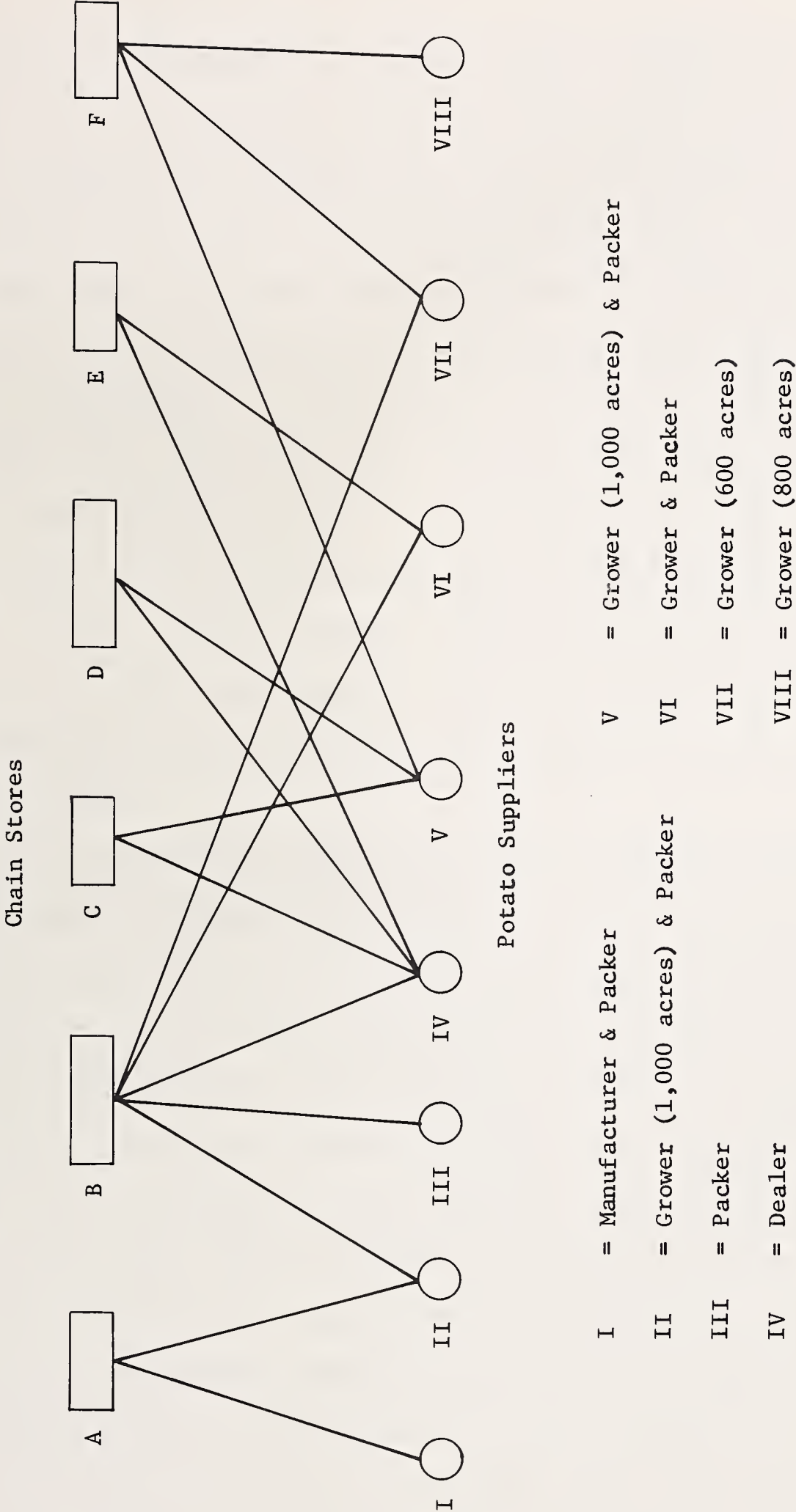
Source: Ontario Department of Agriculture.

Weather conditions, yields and fluctuations in potato acreage may modify this pattern to a certain extent.

There are some 1,400 potato growers in Ontario and a great number of produce buyers. One would, therefore, expect that the establishment of potato prices represents an exemplary case of the interaction of supply and demand through free competition. This assumption may also be supported by the Farmers' Market proceedings at the Ontario Food Terminal. The market opens at 6:00 a.m. daily. A varying number of farmers and truckers offer their produce to individual grocers, pedlars and other buyers. Price is established in the early hours, as a result of direct negotiations between buyers and sellers.

Wholesale price of potatoes is fixed at the Ontario Food Market in a similar way. Buyers check and compare the offers of a number of wholesalers and, as a rule, the lowest-priced tentative deal determines the daily wholesale price. Ontario Food Terminal is a significant factor in influencing prices across the Province, but not the only one, however, and certainly not the most important. In Leamington, and other areas, local shippers, dealers, packers and large-scale growers sell potatoes to retailers, institutions and chain stores, directly or through other dealers and brokers. As has been demonstrated already, many of these intermediaries work directly or via other agents on behalf of the corporate chains, following the purchasing and pricing policies of the latter. Other intermediaries, who sell to independent grocers, institutions, etc., have to adapt themselves to the price

MAJOR CORPORATE CHAIN STORES AND THEIR MAIN POTATO SUPPLIERS



leadership of the major buyers in order to keep themselves and their clients competitive.

From the point of view of the great majority of the growers and small retail outlets the marketing pattern of potatoes appears unorganized, inefficient, overlapping and sometimes even chaotic. Individually they are not in a position to play a part in the determination of prices. While the corporate chains also have to take into consideration the general supply-demand situation, weather conditions, etc., the prevailing high level of concentration (they handle 60 - 65 per cent of total potato sales in the Province) enables them to influence prices through a selective purchasing policy. The chain stores will not buy at a price higher than they consider acceptable and they are in a position to influence prices because of the volumes they purchase. Another prominent element is the system of "special or feature" sales, through which potatoes purchased at depressed prices are marketed. Independent stores must follow these established prices in order to remain in business.

Each day the produce manager of a corporate chain calls the Ontario Food Terminal, the wholesalers and brokers to obtain information on prices. He will gather information on the volume of potatoes available at the various large packing houses while he also has an interest in the retail prices of other corporate chains and their "specials". The manager calculates the exact amount of potatoes required by the retail outlets of his company. After considering all these factors, he decides whom to contact and at what price level to purchase. The corporate chain is infinitely better informed than a grower with, e.g., 50 acres of potatoes, and is evidently in a much more flexible position; it has multiple choices, and fully comprehends that the huge volume of potatoes required by its organization is much too important to be neglected, even if the purchase price offered is lower than the wholesale price at the Ontario Food Market. Corporate chains, as a rule, offer lower than the wholesale price, but they never go higher. In this rather indirect fashion, Toronto wholesale prices have some influence on pricing policies practised by corporate chains.

As previously shown, some corporate chains acquire their potatoes almost exclusively from one major packer-grower. The produce buyer gathers his information on the over-all situation in the manner already described

in the preceding paragraph, and purchase prices are established accordingly. However, in this particular case, the exclusive packer-grower is in a position to transfer the effects of occasional low prices on to his grower-suppliers.

The present state of affairs, involving only a few buyers who control a large proportion of the market, is known as oligopsony. This results in price leadership from the buyers' side. These large buyers decide upon the prices they are willing to pay and other buyers conform. Potato growers are economically divided, most of them are weak; they sell perishable products and, therefore, their bargaining position is unfavourable. Consequently, potato marketing, which appeared on the surface to represent an exemplary case of free competition (with a great number of buyers and sellers) is, in fact, dominated by a few large and powerful corporations.

The Effect of Market Structure on the Potato Growing Industry

The detailed analysis of potato marketing has already indicated that a limited number of large grower-packers, who sell exclusively to chain stores, operate 800 - 1,000 acre potato farms. These farms are well mechanized and apply modern production methods. These large grower-packers have secured a market for their produce and are also relatively well protected against the adverse consequences of price fluctuations. They profit from high potato prices as farmers, and when potato prices are low at farm level, they can still obtain some gains as packers of their own and purchased potatoes. Many other farmers have no access to and connections with corporate chains, consequently they have to market their produce through these large grower-packers. This situation eventually leads to varying degrees of dependence upon these large grower-packers and, indirectly upon the chain stores.

Some large, independent growers, with several hundred acres of potatoes, sell high quality, well-graded potatoes directly to wholesalers, institutions and occasionally to chain stores. These growers have invested heavily in machinery, equipment and storage facilities, and are very sensitive to the uncertainties of the market. This group of large-scale independent growers favours collective action, the establishment of a potato marketing board for regulating prices and perhaps even the volume of production.

Another category consists of the growers who produce both table and processing potatoes. This category is generally well mechanized and operates on a relatively large scale (100 acres of potatoes or more). Partial protection against price fluctuations of table potatoes is provided by processing contracts.*

Smaller potato growers (with less than 100 acres of potatoes) usually tend to be mixed farmers. In general, their potato acreage is too small to allow the economical use of special equipment and modern storage facilities. In the field of marketing, small potato growers are mostly uninformed, unorganized and divided. Many of these growers sell produce which does not meet established grading and quality requirements. Sales are made as quickly as possible, occasionally even straight from the fields. Because of the pressure for ready cash, they are sometimes willing to undersell other growers in the area.

Quality Problems of Ontario Table Potatoes

Table 26 suggests that on the Toronto wholesale market over the 1961 to 1965 period, Prince Edward Island potatoes obtained an average of 42.6 per cent, and New Brunswick potatoes an average of 30.2 per cent premium over Ontario produce. Buyers at all levels show a definite preference for Maritime potatoes.**

At our request, the Ontario Division of the Consumers' Association of Canada surveyed the opinions of some one hundred Toronto housewives concerning Ontario potatoes. In general, the comments centred around the following issues: poor cooking quality of Ontario potatoes, inadequate grading, mechanical injuries and other damages.***

Potato experts summarize the quality problems of Ontario potatoes as follows:

1. Potatoes from New Brunswick, P.E.I. and other provinces are more uniform, since all shipments from one province to another require official inspection. Ontario has only three closed

*The number of large-scale potato growers (100+ acres) is estimated at 80 - 90 in Ontario (seven per cent of total potato growers) with a total potato area of approximately 20,000: i.e., 35 per cent of total potato acreage in the Province.

**Source: Crop and Seasonal Prices Summaries, Canada Dept. of Agriculture.

***Some consumers' letters in Appendix IV.

Table 26

SEASONAL AVERAGE WHOLESALE PRICES OF ONTARIO,
PRINCE EDWARD ISLAND AND NEW BRUNSWICK NO. 1
POTATOES ON THE TORONTO MARKET, 1951-52 TO 1965-66

Seasonal Average	Ontario	P.E.I.	N.B.	Premium of P.E.I. Over Ontario	Premium of N.B. Over Ontario	% P.E.I. Over Ontario	% N.B. Over Ontario
			(Dollars	per Cwt.)		%	%
1951-52	4.61	5.64	5.24	1.03	0.63	22.3	13.7
1952-53	2.88	3.29	3.41	0.41	0.53	14.2	18.4
1953-54	1.52	1.79	1.68	0.27	0.16	17.8	10.5
1954-55	2.90	3.71	3.41	0.81	0.51	27.9	17.6
1955-56	1.86	3.31	2.65	1.45	0.79	78.0	42.5
1956-57	2.25	2,89	2.55	0.64	0.30	28.4	13.3
1957-58	1.87	2.61	2.54	0.74	0.67	39.6	35.8
1958-59	1.77	2.70	2.43	0.93	0.66	52.5	37.3
1959-60	2.28*	4.18	3.77	1.90	1.49	83.3	65.4
1960-61	2.23*	2.94	2.73	0.71	0.50	31.8	22.4
1961-62	1.62	2.34	1.92**	0.72	0.30	44.4	18.5
1962-63	2.17*	2.95	2.56	0.78	0.39	35.9	18.0
1963-64	2.04	3.11	2.84	1.07	0.80	52.5	39.2
1964-65	2.44	4.87	4.58**	2.43	2.14	99.6	87.7
1965-66	2.76	3.93	3.60**	1.17	0.84	42.4	30.4
Average	2.35	3.35	3.06	1.00	0.71	42.6	30.2

* Few quotations only.

**50 lb. bags converted to cwt.

Source: Crop and Seasonal Price Summaries, Fresh and Processed Fruits and Vegetables,
Vol. V - 1951-52, Part II, Canada Department of Agriculture, Ottawa.
Vol. 10 - 1956-57, Part II
Vol. 14 - 1960-61, Part II
Vol. 19 - 1965-66, Part II

areas: Leamington, Niagara and Bradford. Produce grown within
these areas must proceed to designated inspection points for
examination before leaving the district.

2. Some growers pay little attention to quality considerations;
over-fertilization is still frequent, and results in higher
yield but poor quality; use of potato harvesters is not too
careful, and consequently leads to mechanical injuries; grading
and handling of potatoes are also inadequate in many cases.
3. Holland Marsh potatoes, in general, are unattractive, green

easily, and are poor in cooking quality. Likewise, when Ontario's new potatoes are harvested in July and August, they are usually badly skinned, discoloured, wet and soggy by the time they reach the consumer. "The image of Ontario potatoes has improved to some extent, but the old and outdated story is repeated so often by so many people that a negative situation continues to exist."*

4. The last three to four years, however, have witnessed some improvements in quality. Large-scale growers who have invested heavily in potato farming have become interested in supplying good quality and well-graded potatoes to their customers, in order to obtain higher prices and better consumer acceptance.

Chain stores, through their selective purchasing policies, also have made a positive contribution to the improvement of the quality and grading of Ontario potatoes. Grower-packers, dealers and brokers now know their buying habits and thus cater to their desires. Those suppliers who have established a reasonably good reputation are usually able to maintain continuing business with chain stores. A certain amount of potatoes, however, is still purchased directly from producers by truckers, and sold to customers without official inspection. Potatoes sold on the market without some form of inspection are the ones which discredit Ontario potatoes in the eyes of the public.

CHAPTER V

SUMMARY AND RECENT DEVELOPMENTS

Major Characteristics of Potato Marketing

Canadian potato growers - and growers in Ontario are no exception - have experienced incessant and extreme price fluctuations. These extreme and irregular price changes create uncertainty in the minds of the producer with respect to planning the following year's production. The previous year's prices provide little or no guidance to him. He must guess the most probable prices for planning purposes, and these estimated prices may not reflect the future market situation.

Assessing the probable causes of the experienced changes in price, we found great annual shifts in the quantity of potato supplies. The fluctuations in potato quantities have been determined by two factors:

- a) relatively large and mostly unpredictable fluctuations in potato yields, in spite of considerable improvements during the past decade and
- b) slight changes in potato acreage.

Further examination revealed that potato demand and supply are not co-ordinated. From the available statistical data it was established that during the period 1951 to 1965, every million hundredweights of surplus potatoes corresponded to a reduction in the farm price of potatoes of 9 to 13 cents per hundredweight.

The Structure of Potato Marketing

The study pointed out that the system of potato marketing has influenced both potato prices and the structure of the potato growing industry.

At present, Ontario potatoes are sold through two major marketing channels:

- a) Contract growing of processing potatoes, and
- b) Fresh market of table potatoes.

The study has examined first the relationship between potato growers and processors.

Contract growing of processing potatoes is advantageous to both processors and growers: processors can acquire potatoes in the required

quantity, quality and price; growers have a secure market at known prices before planting. This security encourages growers to increase the size of their operation, to apply costly machinery and equipment and modern techniques in general.

Dissatisfaction has been expressed by some of the processors who complain about quality. Many growers, on their part, desire higher prices for their produce. However, growers and processors have mutual interests to maintain continuing business as equal partners.

The situation prevailing on the fresh potato market is less advantageous to the potato growers. In addition to the problems caused by the uncertainty of fluctuations in potato quantity, most growers have to sell on a market dominated by corporate chain stores, which are sufficiently powerful to influence prices and negotiate transactions at price levels frequently considered too low by the growers.

The corporate chains handle large amounts of potatoes. A significant proportion of the produce is purchased from a limited number of large grower-packers and dealers. Smaller growers, who have no direct access to the chain stores, depend to varying degrees upon the purchases of large grower-packers and dealers, and ultimately upon the corporate chains. This situation adds to the gravity of the problems of the majority of potato growers who are already seriously affected by the irregular fluctuations in potato quantity.

Potato Marketing Board

Many potato growers in Ontario are convinced that the establishment of a Marketing Board may solve some of their marketing problems. They expect that such a measure would (a) neutralize the consequences of the irregular and unpredictable fluctuations in potato quantity; (b) balance the economic power of large corporations.

The desired scope of the proposed Marketing Board is still under discussion. The advocates of the idea tentatively agreed that the Board should have two Committees: (a) a Special Committee, with participation of growers and processors would deal with prices, quality requirements, transportation and terms of payment of processing potatoes; (b) another committee would be organized for table potatoes. This committee would

meet at least once a week to establish prices and consider quality and the supply situation. Quality requirements would be strictly enforced and supervision would be obligatory.

At present the bulk of Ontario table potatoes are sold by early November. Accordingly, the Marketing Committee would not control potato prices during the winter. Potatoes unsold by that time would not be subject to price control, and would be disposed of at the discretion of the individual grower.

The Marketing Board would not introduce a quota system in order to regulate acreage and/or quantity; there would be no provision for an organized potato diversion program to dispose of surplus potatoes. The Board would not assume the role of a marketing agency either; growers would contact purchasers directly.

The advocates of the Marketing Board expect that negotiated prices, if enforced, would reduce insecurity in production, foster orderly marketing, and counteract to a certain extent the oligopsonystic power of corporate chain stores. The assumption is that controlled prices established between July and November will be high enough to compensate growers for their low potato prices during the winter.

However, as experience has shown, erratic fluctuations in the quantity of potatoes supplied (due to fluctuations in yields and planted acreage) are always possible. A situation may arise in which large quantities of unsold potatoes could exert such a pressure that prices established by the Marketing Board could not be maintained, and the whole marketing system might collapse. Therefore, it is possible that a Marketing Board, if established, might consider measures to consolidate and further improve the economic situation of the growers. Such measures might involve the staged introduction of acreage and quantity control and a potato surplus disposal program on a continuing basis.

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APPENDIX I

FACTORS INFLUENCING POTATO YIELDS

1. Seed variety - this is important because of -
 - (a) Function: it must be suitable for the final disposal of the crop - early or late table-stock (T.S.), chipping, french-frying, etc.
 - (b) Maturity: it must mature, or at least have a profitable yield by the time that the market or the climate dictates that the crop be harvested.
 - (c) Disease-resistance: must be such that the crop can cope with such air-, soil-, seed- and insect-borne diseases as it is likely to encounter under reasonable management.
2. Seed quality - seed of poor quality, i.e. full of disease, can easily cause losses up to 50 per cent and up to 100 per cent in extreme cases.
3. Seed-treatment - a broad topic because it covers -
 - (a) good storage management - poor temperature and humidity control can cause loss of vigour; exposure to sprout inhibitors can cause anything from slightly reduced vigour to a complete failure to grow.
 - (b) handling from storage to field, avoiding high or low temperature - up to 50 per cent loss.
 - (c) heating seed prior to planting - failure to do so in some seasons can easily cause a 25 per cent loss.
 - (d) cutting the seed so that each seed piece is large enough, blocky and has at least two eyes - up to 20 per cent loss.
 - (e) treating the seed with suitable chemical(s) if conditions indicate that there is a danger of seed-piece decay - up to 25 per cent loss.
4. Fertilizer -
 - (a) type - wrong type not very important as long as nutrients NPK are in balance as indicated by a soil test.
 - (b) amount - insufficient can cause 50 per cent loss.
 - (c) placement - incorrect placement, i.e. broadcasting instead of banding - 15 per cent loss.
5. Date of Planting - delay can cause up to 20 per cent loss, but may be modified by many other factors.

6. Plant population - except in the case of Netted Gem where wide spacing is important, too low a plant population - i.e. too wide a spacing in the row, can lead to many rough, oversize tubers which will reduce marketable, though not necessarily total yield - up to 20 per cent.
7. Weed-control - failure to control a moderate weed-population will cause losses of ten - twenty per cent, but a really high population will reduce yields by 50 per cent.
8. Insect-control - severe physical damage by insects can reduce yields by 50 per cent, but in certain varieties, current-season infection with aphid-transmitted leaf-roll virus causes an internal net-necrosis which renders the crop completely unmarketable.
9. Disease-control - this ranges from two to three(e) to 14 as well as the spray-program to control fungus diseases. Failure to control late blight for example can cause 100 per cent crop loss, as can lack of good management in the other phases mentioned above.
10. Irrigation - proper timing and amount of irrigation can increase total and marketable yields by 100 per cent in a dry year such as 1966.
11. Vinekilling - using the right amount of the right chemical at the time will reduce the tendency to skinning and bruising, will prevent oversize tubers and infection by late blight - one - 100 per cent loss.
12. Harvesting - not waiting until the vines are dead, i.e. harvesting immature tubers, or operating machinery carelessly (too quickly) can cause cuts and bruises on 75 per cent of the tubers.
13. Storage Management - begins with careful grading followed by "curing" period to allow harvest-damage to heal. The tubers should then be stored at the right temperature and humidity with good air circulation. This will minimize shrinkage and spoilage which can run up to 50 per cent.
14. Crop rotation and management - the use of a crop rotation will keep soil-borne diseases such as verticillium wilt at tolerable levels and the management of crop residues will prevent a build up of pitted scab; both of these diseases can render a crop 100 per cent unmarketable.⁽¹⁾

(1) From R. G. Rowberry, Assistant Professor, Department of Horticulture, Ontario Agricultural College.

Table 1

REGRESSION ANALYSIS OF CANADA POTATO SURVEY DATA

Dependent Variable <i>y</i>	Independent Variable <i>x</i>	Constant <i>a</i>	Coefficient		Correlation Coefficient (Partial)	R ²	
			Value <i>b</i>	Std. Error		Value	Significance
1 Acreage (t)	d.Price (t-1)	284.07	6.54	5.27	Insignificant	0.3374	Insignificant
Acre	NPP						
2 Acreage (t)	d.\$/acre (t-1)	293.09	0.02	0.04	Insignificant	0.1411	Insignificant
Acre	NPP*YP						
3 d.Price (t)	Quantity (t)	5.177	-0.00007	0.00003	95% Significant	0.5646	95% Significant
NP	Q						
4 Consump- tion (t)	c.Price (t)	136.738	9.966	6.174	Insignificant	0.4086	Insignificant
CNSM	CP						
5 Consump- tion (t)	d.Price (t)	144.6657	5.3717	6.390	Insignificant	0.2271	Insignificant
CNSM	NP						
6 Consump- tion (t)	INCOME (t)	188.057	-0.023	0.0318	Insignificant	0.1969	Insignificant
CNSM							
7 Acreage (t)	YIELD (t-1)	322.026	0.192	1.4243	Insignificant	.4641	Insignificant
Acre	YP						
	d.Price (t-1)		5.675	0.4411			
	NPP						
8 Acreage (t)	YIELD (t-1)		0.1986	.19451			95% Significant
Acre	YP						
	d.Price (t-1)	-67.775	19.663	6.485	95% Significant	0.783	
	NPP						
	Acreage (t-1)		0.980	.3058			
	AP						
9 Acreage (t)	YIELD (t-1)		-0.25766	0.19037	Insignificant	0.4392	Insignificant
Acre	YP						
	d.Price (t-1)	330.757	2.0407	5.83067			
	CPP						
10 Acreage (t)	YIELD (t-1)		0.23575	0.20828	95% Significant		Insignificant
Acre	YP						
	c.Price (t-1)	-130.085	23.0702	7.84357		0.7758	
	CPP						
	Acreage (t-1)		1.1701	0.36516			
	AP						

Note: 1. NPP = deflated price (actual price divided by agricultural price index).

2. CPP = actual price.

Table 2

REGRESSION ANALYSIS OF CANADA POTATO SURVEY DATA

Dependent Variable y	Independent Variable x	Constant a	Coefficient		R	R ²	
			Value b	Std. Error		Value	Significance*
Domestic Use	time	25,052.5	573.11	105.4	0.8334	0.69	significant
Supply	time	33,691.1	867.17	225.3	0.7298	0.53	significant
Surplus	time	8,638.6	294.06	218.3	0.3500	0.12	insignificant
Price	surplus	3.68038	-0.00012	0.00003	0.6912	0.48	significant
Human Consumption	time	23,076.9	484.39	135.8	0.7033	0.50	significant
Production	time	34,483	938.83	206.2	0.7839	0.61	significant

* at 95 per cent level.

Table 3

REGRESSION ANALYSIS OF ONTARIO POTATO SURVEY DATA

	DEPENDENT VARIABLE y	INDEPENDENT VARIABLE x	CONSTANT a	COEFFICIENT			R	R ²	
				Value b	Std. Error	Significance		Value	Significance
1	Acreage (t) Acre	d.Price (t-1) DPP	47.474	2.3199	1.14739	Insignificant	0.5041	0.2541	Insignificant
2	Acreage (t) Acre	d.\$/Acre (t-1) DPP*YP	53.186	0.00196	0.00903	Insignificant	0.0626	0.0039	Insignificant
3	d.Price (t) DP	Quantity (t) Q	4.1605	-0.00017	.00011	Insignificant	0.3894	0.1516	Insignificant
4	Acreage (t) Acre	YIELD (t-1) YP Price (t-1) CPP Acreage (t-1) AP	-3.91931	0.03165 2.92625 0.82751	0.03165 1.07261 0.3000	95% Significant	0.7620	0.5806	95% Significant

Table 4

REGRESSION ANALYSIS OF CANADA AND ONTARIO POTATO SURVEY DATA

Dependent Variable y	Independent Variable x	Constant a	Coefficient			R ²	
			Value b	Std. Error	Significance	Value	Significance
Acreage t (Canada)	Two previous years' average price	0.24719	0.02513	0.00426	99% significant	0.7437	99% significant
Acreage t (Ontario)	Two previous years' average price	0.04426	0.00339	0.00153	95% significant	0.2923	95% significant

Note Elasticity of supply was calculated at follows:

(a) Elasticity (for Canada) = $\frac{\text{Average price (1951-65)}}{\text{Average acreage (1951-65)}}$.b

= $\frac{2.16268}{301.55}$ x 25.13

= 0.180

(b) Elasticity (for Ontario)= $\frac{\text{Average price (1951-65)}}{\text{Average acreage (1951-65)}}$.b

= $\frac{2.77786}{53.69}$ x 3.39

= 0.175

Table 5

REGRESSION ANALYSIS OF CANADA, ONTARIO AND MARITIMES POTATO SURVEY DATA						
Dependent Variable y	Independent Variable x	Constant a	Coefficient		R	
			Value b	Std. Error		
Yields (Canada)	time	138.4004	-4.07288t	0.5069	0.9106	
			+0.06829t ²	0.00656	99% significant 99% significant	
Yields (Ontario)	time	144.92375	-6.18870	0.68935	0.9337	
			+0.10572	0.00892	99% significant 99% significant	
Yields (Maritimes)	time	144.90108	-3.22389	0.7729	0.8662	
			0.06261	0.010	99% significant 99% significant	
Rate of Yield Fluctuations Canada	time	0.15444	0.00166	0.00055	0.3805	
Rate of Yield Fluctuations Ontario	time	.28232	0.00334	0.00092	0.4464	
Rate of Yield Fluctuations Maritimes	time	.18119	0.00189	0.00065	0.3697	

Table 6

TOTAL SUPPLY OF POTATOES, CANADA, 1961 TO 1966

<u>Year</u>	<u>Total Production (1) (000 's cwt.)</u>	<u>Total Imports (2)</u>		<u>Total Exports</u>		<u>Total Supply (000 's cwt.)</u>
		<u>(000 's cwt.)</u>	<u>% of Total Supply</u>	<u>(000 's cwt.)</u>	<u>% of Total Production</u>	
1961	44,108	2,325	5.3	2,254	5.1	44,179
1962	46,671	1,663	3.8	4,553	9.8	43,781
1963	45,809	1,994	4.5	3,572	7.8	44,231
1964	47,733	1,411	3.2	4,561	9.6	44,583
1965	46,472	1,432	3.3	4,131	8.9	43,773
1966	54,679	2,687	5.0	3,265	6.0	54,101

(1) Excludes Newfoundland, Yukon and Northwest Territories.

(2) Excludes fresh sweet potatoes.

Table 7

POTATO EXPORTS, CANADA, BY COUNTRIES, 1961 AND 1966

Country	Seed Potatoes			Table Potatoes		
	1961			1961		
	cwt.	%	\$000's	%	\$000's	%
United States	695,062	43.8	1,800	199,926	30.1	273
Venezuela	298,895	18.8	1,227	90,535	13.6	179
Cuba	250,141	15.7	377	79,450	11.9	136
Uruguay	197,791	12.5	340	70,062	10.5	184
Greece	65,532	4.1	191	49,328	7.4	89
Jamaica	55,839	3.5	147	39,566	6.0	69
Other	25,712	1.6	85	136,064	20.5	304
Total	1,588,972	100.0	4,167	664,931	100.0	1,234
						100.0
Country	1966			1966		
	cwt.	%	\$000's	cwt.	%	\$000's
	cwt.	%	\$000's	cwt.	%	\$000's
United States	646,187	30.9	1,905	531,308	45.3	1,458
Cuba	382,372	18.3	1,170	247,780	21.2	753
Uruguay	230,089	11.0	787	156,143	13.3	512
Italy	226,888	10.8	823	57,269	4.9	168
Venezuela	211,620	10.1	963	56,928	4.9	149
Argentina	179,473	8.6	445	40,070	3.4	138
Greece	130,557	6.2	524	82,462	7.0	276
Other	85,437	4.1	330			
Total	2,092,623	100.0	6,947	1,171,960	100.0	3,454
						100.0

Table 1

FARM CASH INCOME, TOTAL AND FROM POTATOES, CANADA AND PROVINCES, 1961 TO 1966

Year		Canada(1)	P.E.I.	N.S.	N.B.	Maritime Provinces			Man.	Sask.	Alta.	B.C.
						(thousands of dollars)						
						Que.	Ont.					
1961	Total	2,926,061	23,501	46,310	39,224	109,035	417,740	874,110	243,060	611,901	536,917	133,298
	Potatoes	46,409	5,972	1,137	7,504	14,613	11,049	12,682	602	141	2,805	4,517
	%	(1.6)	(25.4)	(2.5)	(19.1)	(13.4)	(2.6)	(1.5)	(0.2)	*	(0.5)	(3.4)
1962	Total	3,172,101	24,284	46,792	40,913	111,989	442,218	924,199	261,529	709,865	573,781	148,520
	Potatoes	45,932	6,148	1,130	8,321	15,599	9,265	12,520	1,298	142	2,999	4,109
	%	(1.4)	(25.3)	(2.4)	(20.3)	(13.9)	(2.1)	(1.4)	(0.5)	*	(0.5)	(2.8)
1963	Total	3,212,650	25,299	47,399	40,901	113,599	453,902	996,936	270,374	698,205	530,208	149,426
	Potatoes	49,882	8,015	1,164	9,862	19,041	9,060	13,974	1,695	182	2,691	3,239
	%	(1.6)	(31.7)	(2.5)	(24.1)	(16.8)	(2.0)	(1.4)	(0.6)	*	(0.5)	(2.2)
1964	Total	3,499,373	31,664	46,735	47,458	125,857	459,330	1,020,275	299,795	837,951	602,258	153,907
	Potatoes	64,909	12,685	1,480	15,377	29,542	9,786	14,875	3,134	259	3,134	4,179
	%	(1.9)	(40.1)	(3.2)	(32.4)	(23.5)	(2.1)	(1.5)	(1.0)	*	(0.5)	(2.7)
1965	Total	3,818,281	40,629	51,487	60,397	152,513	510,196	1,103,964	340,852	887,729	657,331	165,696
	Potatoes	104,311	18,965	1,606	25,788	46,359	13,104	25,413	6,528	367	6,091	6,449
	%	(2.7)	(46.7)	(3.1)	(42.7)	(30.4)	(2.6)	(2.3)	(1.9)	*	(0.9)	(3.9)
1966	Total	4,273,575	36,561	55,556	54,473	146,590	613,478	1,241,915	374,161	946,532	760,732	190,167
	Potatoes	80,501	11,978	1,814	16,441	30,233	9,834	23,161	5,985	276	5,848	5,164
	%	(1.9)	(32.8)	(3.3)	(30.2)	(20.6)	(1.6)	(1.9)	(1.6)	*	(0.8)	(2.7)

*Less than 0.05 per cent.

(1) Excludes Newfoundland.

Total - total farm cash income from farming operations.

Potatoes - farm cash income from potatoes.

Per cent - farm cash income from potatoes as a per cent of total farm cash income.

Table 2

POTATO PRODUCTION, CANADA AND PROVINCES, 1961 TO 1966

<u>Year</u>		<u>Canada</u> (1)	<u>P.E.I.</u>	<u>N.S.</u>	<u>N.B.</u>	<u>Maritime Provinces</u> (thousands of cwt.)	<u>Que.</u>	<u>Ont.</u>	<u>Man.</u>	<u>Sask.</u>	<u>Alta.</u>	<u>B.C.</u>
1961	No. %	44,108 (100.0)	7,623 (17.3)	1,053 (2.4)	10,162 (23.0)	18,838 (42.7)	9,516 (21.6)	9,819 (22.3)	767 (1.7)	357 (0.8)	2,545 (5.8)	2,266 (5.1)
1962	No. %	46,671 (100.0)	7,462 (16.0)	932 (2.0)	10,690 (22.9)	19,084 (40.9)	9,609 (20.6)	9,581 (20.5)	2,622 (5.6)	975 (2.1)	2,800 (6.0)	2,000 (4.3)
1963	No. %	45,809 (100.0)	8,300 (18.1)	1,000 (2.2)	10,828 (23.6)	20,128 (43.9)	8,364 (18.3)	9,792 (21.4)	2,205 (4.8)	1,100 (2.4)	2,500 (5.5)	1,720 (3.7)
1964	No. %	47,733 (100.0)	8,372 (17.5)	965 (2.0)	11,610 (24.3)	20,947 (43.8)	8,208 (17.2)	10,494 (22.0)	2,940 (6.2)	920 (1.9)	2,429 (5.1)	1,795 (3.8)
1965	No. %	46,472 (100.0)	7,341 (15.8)	858 (1.8)	11,280 (24.3)	19,479 (41.9)	7,239 (15.6)	10,584 (22.8)	3,100 (6.7)	970 (2.1)	3,000 (6.4)	2,100 (4.5)
1966	No. %	54,679 (100.0)	10,776 (19.7)	973 (1.8)	14,450 (26.4)	26,199 (47.9)	8,770 (16.0)	10,003 (18.3)	3,062 (5.6)	619 (1.1)	3,907 (7.2)	2,119 (3.9)

(1) Excludes Newfoundland, Yukon and Northwest Territories.

Table 3

POTATO SHIPMENTS FROM ONTARIO TO OTHER PROVINCES, 1961 TO 1966
(thousands of cwt)

<u>Year</u>		<u>Total</u>	<u>Nfld.</u>	<u>P.E.I.</u>	<u>N.S.</u>	<u>N.B.</u>	Maritime Provinces (sub-total)	<u>Que.</u>	<u>Man.</u>	<u>Sask.</u>	<u>Alta.</u>	<u>B.C.</u>
1961	No. %	69 (100.0)	44 (63.8)	-	14 (20.3)	6 (8.7)	64 (92.8)	-	3 (4.3)	-	2 (2.9)	-
1962	No. %	133 (100.0)	58 (43.6)	1 (0.8)	38 (28.5)	24 (18.0)	121 (90.9)	4 (3.0)	6 (4.5)	1 (0.8)	-	1 (0.8)
1963	No. %	48 (100.0)	30 (62.5)	-	11 (22.9)	3 (6.3)	44 (91.7)	3 (6.3)	1 (2.0)	-	-	-
1964	No. %	74 (100.0)	41 (55.4)	-	21 (28.4)	8 (10.8)	70 (94.6)	3 (4.1)	-	-	1 (1.3)	-
1965	No. %	127 (100.0)	62 (48.8)	1 (0.8)	33 (26.0)	21 (16.5)	117 (92.1)	1 (0.8)	8 (6.3)	-	1 (0.8)	-
1966	No. %	48 (100.0)	46 (95.8)	-	-	1 (2.1)	47 (97.9)	1 (2.1)	-	-	-	-

Table 4

POTATOES, YIELD PER ACRE, CANADA AND PROVINCES, 1961 TO 1966

Year	Canada (1)	Maritime Provinces										
		P.E.I.	N.S.	N.B.	(cwt.)			Que.	Ont.	Man.	Sask.	Alta.
1961	144.3	165.0	130.0	187.5	173.6		118.5	190.7	37.8	30.0	121.8	184.2
1962	162.0	182.0	137.1	213.8	195.1		134.2	192.0	114.0	75.0	127.3	185.2
1963	160.5	197.6	144.9	204.3	197.5		123.0	192.0	105.0	86.6	116.3	184.9
1964	169.7	209.3	146.2	215.0	208.2		135.0	198.0	120.0	78.0	115.1	191.0
1965	155.5	170.7	122.6	197.9	182.0		114.0	189.0	117.0	78.9	130.4	200.0
1966	171.4	206.4	156.9	222.7	212.5		117.4	192.0	125.0	72.8	153.8	201.8

(1) Excludes Newfoundland, Yukon and Northwest Territories.

Table 5

POTATOES, YIELD PER ACRE OF CANADA AND PROVINCES SHOWN AS A PER CENT OF ONTARIO, 1961 TO 1966

Year	Ontario	Canada ⁽¹⁾	P.E.I.	N.S.	N.B.	Maritime		Que.	Man.	Sask.	Alta.	B.C.
						Provinces	Per Cent					
1961	100.0	75.7	86.5	68.2	98.3	91.0		62.1	19.8	15.7	63.9	96.6
1962	100.0	84.4	94.8	71.4	111.4	101.6		69.9	59.4	39.1	66.3	96.5
1963	100.0	83.6	102.9	75.5	106.4	102.9		64.1	54.7	45.1	60.6	96.3
1964	100.0	85.7	105.7	73.8	108.6	105.2		68.2	60.6	39.4	58.1	96.5
1965	100.0	82.3	90.3	64.9	104.7	96.3		60.3	61.9	41.7	69.0	105.8
1966	100.0	89.3	107.5	81.7	116.0	110.7		61.1	65.1	37.9	80.1	105.1

(1) Excludes Newfoundland, Yukon and Northwest Territories.

Table 6

POTATOES, FARM VALUE IN DOLLARS PER ACRE, CANADA AND PROVINCES, 1961 TO 1966										
Year	Canada ⁽¹⁾	P.E.I.	N.S.	N.B.	Maritime Provinces	Que. (Dollars)	Ont.	Man.	Sask.	B.C.
1951	202.59	150.15	213.21	166.86	163.21	183.69	298.70	88.77	90.00	473.50
1962	253.79	260.27	274.12	267.24	264.80	203.99	364.81	129.96	112.46	455.56
1963	275.43	296.43	260.87	286.02	288.61	227.54	384.00	139.67	160.24	462.37
1964	492.50	606.98	416.67	612.74	597.58	337.50	535.36	360.00	288.47	802.02
1965	374.80	375.58	331.00	376.00	372.89	288.43	538.64	266.72	220.81	674.00
1966 ⁽²⁾	287.56	253.91	266.77	249.37	252.17	226.59	347.50	328.69	182.12	605.43

(1) Excludes Newfoundland, Yukon and Northwest Territories.
(2) Preliminary.

Table 7

POTATOES, FARM VALUE IN DOLLARS PER ACRE OF CANADA AND PROVINCES SHOWN AS A PER CENT OF ONTARIO, 1961 TO 1966

Year	Ontario	Canada ⁽¹⁾	P.E.I.	N.S.	N.B.	Maritime Provinces					
						Per Cent					
							Que.	Man.	Sask.	Alta.	B.C.
1961	100.0	67.8	50.3	71.4	55.9	54.6	61.5	29.7	30.1	86.4	158.5
1962	100.0	69.6	71.3	75.1	73.3	72.6	55.9	35.6	30.8	62.8	124.9
1963	100.0	71.7	77.2	67.9	74.5	75.2	59.3	36.4	41.7	59.0	120.4
1964	100.0	92.0	113.4	77.8	114.5	111.6	63.0	67.2	53.9	86.0	149.8
1965	100.0	69.6	69.7	61.5	69.8	69.2	53.5	49.5	41.0	54.5	124.1
1966 ⁽²⁾	100.0	82.8	73.1	76.8	71.8	72.6	65.2	94.6	52.4	109.3	174.2

(1) Excludes Newfoundland, Yukon and Northwest Territories.
(2) Preliminary.

Appendix II

Table 8

POTATO SHIPMENTS TO ONTARIO FROM OTHER PROVINCES, 1965 AND 1966

Shipments from:	<u>1965</u>		<u>1966</u>	
	(000's cwt.)	%	(000's cwt.)	%
Prince Edward Island	2,230	65.1	2,022	65.8
New Brunswick	1,118	32.7	980	31.9
Quebec	71	2.1	42	1.4
Manitoba	4	0.1	10	0.3
Alberta	1	*	19	0.6
Total Shipments to Ontario	3,424	100.0	3,073	100.0

*Less than 0.05 per cent.

Note: A comparable breakdown by provinces for earlier years is not available.

Source: Ontario Food Council.

APPENDIX III

POTATO CONTRACTS

The terms and specifications of the contracts of different companies show a considerable variety. However, all of these contracts contain provisions on size, specific gravity, production techniques, delivery, inspection and grading. A model contract between a processing company and a grower reads as follows.

MODEL POTATO CONTRACT

	GROWER.....
	POSTAL ADDRESS.....
SEBAGO VARIETY.....LBS.BAGS
KENNEBEC VARIETY.....LBS.BAGS
CHEROKEE VARIETY.....LBS.BAGS
..... VARIETY.....LBS.BAGS
TOTAL.....LBS.BAGS

The undersigned Grower agrees to grow potatoes of the above variety or varieties during the growing season and to sell to the Company, and the Company agrees to purchase the above quantities of the above varieties of potatoes to be grown by the Grower at the prices calculated in the manner, and upon the terms and conditions, set out below:

1. All potatoes supplied hereunder shall be of the specified varieties, shall be over 1-1/2" in diameter and shall conform, except with respect to size to the standards for Ontario #1 Grade potatoes as established by The Farm Products Grades and Sales Act and Regulations made thereunder (hereinafter called the "Act and Regulations"), such standards being set out on the reverse hereof.
2. PRICE - Subject to the provisions of sub-paragraphs (a), (b) and (c) of this paragraph, the PRICE (hereinafter called the "BASE PRICE") to be paid for all potatoes delivered hereunder shall be \$1.40 PER CWT. delivered at the Plant or a storage warehouse in the area designated by the Company at its option.
 - (a) The BASE PRICE with respect to any shipment shall be increased to the following respective prices in the event that the potatoes contained in such shipment have an average specific gravity of 1.074 or higher:

1.069 - 1.073 inclusive	- \$1.40 PER CWT. delivered (BASE PRICE)
1.074 - 1.076 inclusive	- \$1.45 PER CWT. delivered
1.077 - 1.079 inclusive	- \$1.50 PER CWT. delivered
1.080 and higher	- \$1.55 PER CWT. delivered
 - (b) If the average specific gravity of any shipment of potatoes delivered hereunder is less than 1.069, the Company shall have the right to return to the Grower, sufficient potatoes grading below 1.069 to increase the average specific gravity of the remaining potatoes in such shipment to 1.069. The Company shall have the right to deduct \$1.40 PER CWT. of the potatoes so returned from any moneys payable by it to the Grower.
 - (c) If 45% or more of the potatoes in any shipment delivered hereunder are not of sufficient size to qualify as Ontario #1 Grade, the BASE PRICE with respect to such shipment shall be reduced 1¢ for each additional 1% over 45% of such potatoes which do not so qualify. If 60% or more of such potatoes do not so qualify, such shipment shall be subject to rejection by the Company unless a purchase price for such shipment is agreed between representatives of the Company and the Grower.
3. Each shipment shall be graded upon delivery at the Company by a licensed Ontario Department of Agriculture Inspector. Should any shipment when being unloaded appear not to be uniform in quality, a re-grade on the remaining portion of such shipment may be requested. Subject to any right to an appeal inspection given by the "Act and Regulations", the grading of such Inspector

shall be final, but the Company may reject any shipment of potatoes which is not, in the Company's reasonable judgement, suitable for processing by the Company because of any undesirable characteristics. Any such rejection will apply only to the shipment or portion of a shipment expressly rejected.

4. The Grower shall be obliged to deliver all potatoes grown by him or on his property to the Company until such time as the total quantity required under this contract has been in fact delivered to the Plant.
5. Neither Grower nor the Company shall be liable for any default or delay in the performance of this contract or any of its terms resulting from any circumstances beyond its reasonable control.
6. Representatives of the Company may inspect the Grower's Crop and soil conditions at any time and from time to time during the Season and make recommendations as to any improved practices which should be followed.
7. Dates of planting, harvesting and delivery shall be by mutual agreement between the Grower and the Company.
8. All potatoes delivered under this contract shall be top killed by approved methods at least 15 days prior to digging.
9. The Grower shall protect all potatoes from frost promptly after removal from the ground and shall keep them so protected until delivery. In the event of ground frost occurring when potatoes remain in the ground, the Grower shall secure approval from the Company prior to resumption of digging.
10. It shall be the responsibility of the Grower to ensure that all potatoes delivered under this contract conform to Federal Food and Drug Directorate Regulations with respect to residuals resulting from the use of agricultural chemicals. The Company shall have the right to reject any potatoes not so conforming and to return them to the Grower at the Plant or any designated storage warehouse. The Grower should examine the recommendations with respect to procedures and applications of approved agricultural chemicals as laid down in the Ontario Department of Agriculture publication "1966 Ontario Vegetable Production Recommendations".

.....COMPANY

BY.....

GROWER.....

Table 1

POTATO HANDLING MACHINERY AND EQUIPMENT

		<u>Approximate Cost</u>
		\$
Seed Cutter	Spool Type - 2, 3, and 4 Cuts	1,250
Seed Treater	Dry Type	300
	Wet Type	330
Planter	2 Row (Pick Type)	1,950
	2 Row (Cup Type Where Available)	2,100
	2 Row (Tuber Type)	2,750
	4 Row (Tuber Unit)	6,000
Harvester (Combine)	2 Row P.T.O. (Grey-Snider), 4-7 ac/day	7,500
	2 Row P.T.O. (Beam), 6-9 ac/day	9,400
	2 Row Self Propelled (Beam), 6-9 ac/day	11,000
	2 Row S.P. (Dahlman), 9-12 ac/day	13,500-14,000
1 Row Digger	Not Available from Most Companies Where Available	1,000
1 Row Picker	For Use Behind 1 Row Digger	650
Pallet Box Filler	1,500-2,000 Bags/day	1,650
Pallet Box Dumper	1,500-2,000 Bags/day	1,650
Bulk Harvesting Box	For Installation on Convention Truck Chassis or Wagon - Self Unloading Through a 14" Chute, 220 Bags/load	850
Bin Loader	Hopper Receiver, Elevates 22" Boom	2,400 Live
	Potatoes Up Into Storage 25" Boom	2,920 Power
Field Lift	Rear Mounted	1,000
	3-Point Hitch	100
	Addition to Manure Loader	300
Storage Lifts	- Stacker, 1,500 Lb. Lift, Hydraulic, Hand Pushed, 9' Lift Maximum	600
	- Stacker, 2,500 Lb. Lift, Hydraulic Lift With Electric Movement, 11' Lift Maximum	3,200
	- Lift Truck, 2,500 Lb. Lift, All Electric, 17' Lift Maximum	7,000-11,000
Grader	26" Width 1,500 - 2,000 Bags/day	1,950
Bagger Head	(For 5's, 10's, 25's) 1,500 - 2,000 Bags/day	2,200
Trench Unloader	2,000 Bags/day	850
Storage	Bulk or Box 55¢/bag	40¢/bushel
Packing Area	Concrete Floor, Uninsulate	\$1.50/sq. ft.
	Concrete Floor, Insulated	\$2.40/sq. ft.

Note: Prepared by Mr. L. F. Mainprize, P.Ag., Provincial Potato Extension Specialist.

APPENDIX IV

QUALITY PROBLEMS OF ONTARIO TABLE POTATOES

Table 16 suggests that on the Toronto wholesale market in the 1961 to 1965 period, Prince Edward Island potatoes obtained an average 42.6 per cent, and New Brunswick potatoes an average 30.2 per cent premium over Ontario produce. Buyers at all levels show a definite preference for Maritime potatoes.

The Views of Potato Buyers

The chief produce buyers of two major chain stores offered the following explanation when their views were solicited:

"Sufficient supplies of Ontario grown potatoes are available up until November and then, unfortunately, we cannot get consistent supply.

Last year we were running Ontario potatoes and we were told that the farmers, or the holders of the potatoes, were going to hold back and did not want to ship out of storage until they could see what the Maritimes were doing.

In order to have a supply, we bought Maritime potatoes. The following week these same men came back - opened their storages - and wanted us to purchase potatoes. However, we had these other potatoes in transit.

The quality of Ontario potatoes has shown a big improvement in the last three or four years. However, they do not do as good a grading job here in Ontario as they do in the Maritimes.

The Maritimes are promoting their potatoes to a greater extent.

We feel that there has been considerably more blight in Ontario potatoes, especially in the Alliston area.

These potatoes, when shipped out of this area had a tendency to break down completely in two to three day periods. It would appear that this was the worst area for Ontario grown potatoes.

It is our findings that the storage quality of the P.E.I. versus Ontario potatoes are much greater and also our customers have expressed to us the fact that they can cook, bake or chip the P.E.I. potatoes better than they can Ontario's."

A second buyer of a major chain store expressed the following views:

"As the Maritime potatoes, particularly Prince Edward Island potatoes, are top quality, clean, well-graded potatoes and are well accepted by the Ontario housewife, they naturally take over a predominant share of the market. You also mention that there is an insufficient amount of Ontario-grown potatoes and I think we would have to agree with this statement as the Ontario potato supplies appear to dry up fairly early every winter. With regards to the transportation problem and freight assistance, I do not think that there is any great problem here. I also would agree that Ontario needs to do more promotional work on their potatoes in Ontario itself as well as elsewhere.

The major retailer and consumer complaints about Ontario potatoes are pretty well as mentioned above. Availability on a consistent basis, good quality on a consistent basis and of course, some promotional work.

As to proposals to eliminate the above difficulties, I would say here that someone or some council should perhaps look at getting some material out to the housewives and that a more thorough understanding of grading and quality requirements needs to be conveyed to the numerous packers and growers. Ontario potatoes should also be promoted and sold while they are still in season and not stored away in hopes of higher prices. In many instances they are brought out to the public at a later date when supplies are low and quality is poorer. It would seem that a few growers and packers "salt away" a few potatoes in the hopes of a higher market each year and this leads to further difficulties regarding early consistent supplies and disrupts the marketing trend."

Consumers' Opinion

At our request, the Ontario Division of the Consumers' Association of Canada collected the views of one hundred Toronto housewives on Ontario potatoes. In general, the comments centered around the following issues:

poor cooking quality of Ontario potatoes,
inadequate grading, mechanical injuries
and other damages.

Some of the consumer opinions seem to be particularly interesting, and were included in the present report.

Consumer No. 1

"In my opinion - from experience with consumer problems - Ontario potatoes are not popular.

- quality is not good - Ontario potatoes are wet - soggy - turn dark on cooking
- Western and Eastern (P.E.I. and New Brunswick) potatoes are dry and white
- more complaints have been received on Ontario potatoes being packaged dirty, bruised from rough handling, cut from machine damage."

Consumer No. 2

"I don't like the way many Ontario potatoes bake. They don't turn "mealy". I object to buying potatoes that are very dirty or that have many bad spots. I feel that Maritime potatoes are often better in this respect. I have no place to store potatoes that is cool, so in February and March and later I have great difficulty keeping potatoes.

I use a lot of instant at that time. I think the grading of potatoes is a little lax. I can understand an occasional bag which is not up to standard but when repeated purchases are the same I wonder about inspection."

Consumer No. 3

"I often wonder about the grading, and am not very happy when I buy a bag of potatoes and find them mostly too big for baking. I like nice medium potatoes that I can serve one to a person for baking. Not several little ones or half a huge one! When I find the quality is poor in a bag I return them to the store before using any - this didn't happen too much last year, but the year before was a bad one. We have had trouble with potatoes that look perfectly fine when they are peeled, but have dark patches after cooking."

Consumer No. 4

"I have bought 'Marsh' potatoes and found them often green and uneven in texture and, therefore, uneven in cooking."

Consumer No. 5

"I avoid buying Ontario potatoes because they are of poor quality due possibly to lack of careful handling in harvesting and to poor inspection. Grading too is responsible as I do not feel Ontario potatoes rate as Canada Choice No. 1 in every case. Packaging - seems to be similar to Maritime potatoes."

Consumer No. 6

"There is no doubt that grading, packaging, promotion and public relations are absolutely lacking - sizing, and use of the potato (boil, bake, etc.) are never apparently the consideration taken by the producer. The green hard watery marsh potatoes are just a fraud! Today in the stores of a major chain, 5 and 10 lb. bags of potatoes, U.S.A. produce were being featured - our own Ontario 'new' potatoes were lying in a bin, unidentified by any sign, in ordinary unmarked brown paper bags, with the clerk having inked on the weight and price - but not a single 'whisper' of the coming to market of what is so welcome."

Potato Quality and Inspection in Ontario

In general, the Farm Products Inspection Branch is responsible for fruit and vegetable inspection within Ontario. All fruits and vegetables are subject to inspection (as to grade) except those that are not compulsory as outlined in The Farm Products Grades and Sales Act. Produce grown, packed and sold within the Province is the responsibility of the Inspection Board. Inspectors on the Farm Products Inspection Service inspect produce at all levels, packers, shippers, wholesalers and retailers.

The grades outlined in the Act are a result of resolutions presented by the Ontario Fruit and Vegetable Growers Association to Government.

Ontario has three closed areas: Leamington, Niagara and Bradford. Produce grown within these areas must proceed to designated inspection points and remain for inspection before they proceed out of the district.

In all, the Branch employs thirty-six full-time inspectors and five supervisors. These people are situated in the heavy producing areas of the Province - Vineland Station, Leamington, Toronto, Bradford and Barrie.

The Canada Department of Agriculture is responsible for all produce that is packed and moved out of the Province or exported. Their head office is located in Hamilton. They employ six supervisors and a number of inspectors. They also maintain the General Service Units throughout the Province. These people inspect fruit and vegetables at retail outlets in the larger cities.

Methods and Scope of Inspection

(a) Farm Level

A great deal of the work of the Inspection Service is at the farm level, helping the grower on maturity of the crop, packing and container problems.

(b) Dealer, Wholesale Level

At the height of the growing season, there are inspectors at the various platforms certifying loads of produce moving to the markets. They also make weekly visits to the various wholesale houses in the cities and towns.

(c) Intercity Transportation

This activity is not subject to Provincial inspection regulations

(except the packing of produce in the vehicle) and any rough handling of the produce such as throwing, kicking and dropping containers of fruits and vegetables.

Interprovincial and Foreign Trade

This is mainly the responsibility of the Federal Department. Produce arriving from U.S.A. must meet import requirements (be within Provincial minimum grade).

Problems of Potato Quality

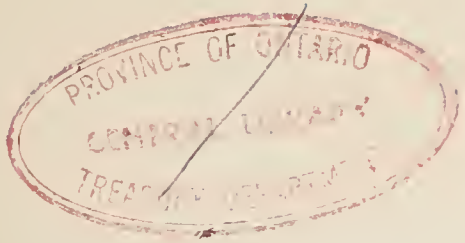
The opinion of the Inspection Branch is that any problems on potato quality was created by the grower himself: "Growers will take all kinds of care in

- (1) preparing the soil
- (2) planting the seed (except for bacterial ring rot)
- (3) cultivating
- (4) fertilizing, and
- (5) general cultural practices

but then at harvest time, this care is all but forgotten. They run the digger fast and everything is done in a rush. In most cases the potatoes are not graded properly and when they are ready for the market, they just manage to meet the grade, and in many instances fail to meet the grade. The Inspection Board maintains that if growers would take as much care in preparing potatoes for market as they do in growing them, we would not have many problems with quality."

Ontario. Dept. of
Treasury and Economics.
Policy Planning
Division
Potatoes in Ontario

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HD/9235/.P82/.P67/1968

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